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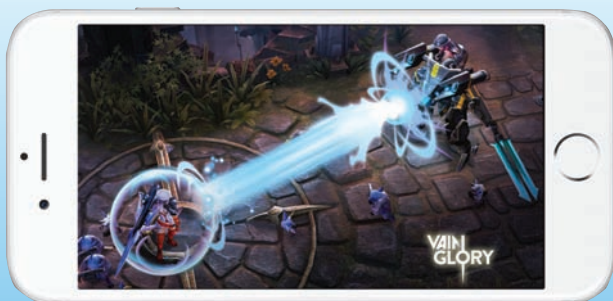
MARCH 2015

## MAC TRICKS

10 AMAZING THINGS YOU DIDN'T  
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# Macworld Contents

MARCH 2015



- 7** [Spotlight: David Price](#)  
Apple vs Samsung
- 8** [News](#)  
Apple's best ever quarter
- 12** [Best-value Mac](#)  
If you're looking for a low-cost Mac we'll help you choose
- 20** [10 amazing Mac tricks](#)  
Bet you didn't know your Mac did this
- 24** [Set up a new Mac](#)  
We show you how to get started
- 26** [10 apps for a new Mac](#)  
Enhance your user experience
- 30** [15 iTunes tips & tricks](#)  
Get more out of iTunes 12
- 33** [Mac security options](#)  
Four essential security tools
- 34** [Ask the iTunes Guy](#)  
We demystify artwork and wishlists
- 36** [Apple Watch revolution](#)  
Taptics, haptics and the body fantastic
- 38** [10 fascinating Apple facts](#)  
Test your Apple knowledge
- 39** [Lessons for Apple](#)  
Seven lessons Apple could learn from Microsoft
- 40** [Group test: Smart heating](#)
  - 41** Tado Smart Thermostat
  - 44** Hive Active Heating
  - 46** Nest Learning Thermostat
  - 48** Heat Genius
- 54** [Group test: Cameras](#)
  - 55** Canon EOS 7D Mark II
  - 55** Fujifilm X-T1
  - 56** Kodak PixPro S-1
  - 56** Nikon D810
  - 57** Olympus OM-D E-M10
  - 57** Panasonic Lumix DMC-GH4
  - 58** Samsung NX1
  - 58** Sony A7 Mark II

# Macworld Contents

60



## 60 Reviews

- 60 Apple Mac mini 2.8GHz
- 62 Mac mini 2014 vs mini 2012
- 64 OS X Yosemite vs Windows 10
- 67 Epson Ecotank L555
- 68 Synology DS414j
- 69 Seagate NAS

## 70 Help Desk

Answering your tech questions

## 72 Spotlight: Neil Bennett

Are weak passwords okay?

## 73 Locating iPhoto images

Find your long-lost photos

## 74 New and noteworthy

Best new kit for your iOS device

## 76 What is HomeKit?

Apple's smart home vision

## 79 Top tips for Safari in iOS 8

Master Apple's updated browser

## 80 Best iPad work apps

Boost your productivity

## 82 Best free iPhone games

14 of our favourites

## 87 Spotlight: Ted Landau

The iPad isn't doomed

## 88 Steve Jobs: The Movie

Everything you need to know

## 90 Turn off Autocorrect

If AutoCorrect is getting on your nerves, relief is at hand

## 91 Spotlight: Andrew Harrison

Let's get metaphysical

## 92 Subscriptions

Getting the latest issue of *Macworld*

## 94 Buyers' guide

The best hardware and software

## 114 Spotlight: Simon Jary

After five years, I've fallen out of love with the iPad

## contact...

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# Macworld





# Apple's bumper results

Good news for Apple, bad news for Samsung (and the rest of us)

One day the predictions will come true and Apple will get knocked off its perch; *sic transit gloria cupertini*.

But that day has yet to come, as we discovered at the company's earnings call last month. There is only one thing we say to Death: "Not this fiscal quarter".

In fact, Apple did a great deal more than put off the Grim Reaper for a few more years, which is what you might have expected from those predictions I mentioned just now: some of the analyst comment before the iPhone 6 and 6 Plus came out verged on the apocalyptic. The firm's Q1 2015 was the most lucrative quarter of any public company in American history and arrived, with brutal timing, just days before erstwhile rival Samsung was obliged to trot out its own (less than triumphant) numbers. The great handset war of the first half of the 2010s may be drawing to a close. If the fat lady isn't singing quite yet, she's definitely doing her gargling exercises.

Yet I for one hope that the present dip in the fortunes of Samsung's mobile business is not terminal. (It does at least have numerous other subsidiary businesses to lean on, from insurance to theme parks, although some would argue that the Korean giant's sprawling jack-of-all-trades approach is one of the reasons why it's losing to laser-focused Apple.) Competition is good for everyone, and in hardware terms, Samsung has been Cupertino's most credible rival for years. An unchallenged Apple is a far less appealing prospect.

Google and Amazon are Apple's real rivals, of course, and in broad terms the second half of this decade will be all about those three companies fighting it out for tech-market dominance. But each one currently concentrates on a different segment: Google rules data gathering



Competition is good for everyone, and in hardware terms, Samsung has been Cupertino's most credible rival for years

and free software services, Amazon is the king of content and distribution, and Apple does the best and most popular hardware. The sad fact is that, if Samsung were removed as a credible threat, none of these companies would be truly tested in their own realm.

## Areas of overlap

Granted, outside the specialisms listed above there are areas of overlap. Google continues to assault Apple's homelands through proxy hardware makers. Apple and Amazon are both phenomenal shifters of digital content, and while they presently slide past one another somewhat (music, video content and – most lucratively of all – apps are Apple's cash cows, while Amazon is

unrivalled in the field of digital books) these areas are likely to blur.

And from time to time, the big three make more overt land grabs on one another's territories – but they are usually repelled. Google makes a smartphone; Amazon makes a tablet; Apple makes a mapping service; things generally proceed much as before. Each giant seems too strong to be defeated on its own turf, reminding me a little of the politically convenient perpetual war between the three superstates in *Nineteen Eighty-Four*.

Nobody would argue that tech consumers face a future as dystopian as that, but a world of semi-competing but largely separate monopolies is a dispiriting thought. As an Apple fan, I like the fact that Samsung gave the company a run for its money in the premium smartphone space: it forced it to innovate, to sharpen up its software, to show up the bad ideas and copy the good ones. It made the iPhone what it is today.

For an idea of what Apple is like when it sits in splendid isolation, take a look at the unchallenged first-party apps on iOS – the ones you're obliged to keep as the default even when better alternatives exist. Calendar is a pale shadow of Fantastical. iBooks is weaker than the Kindle app. Newsstand and Stocks simply aren't very useful for most people. Imagine if all these apps had to fight for their place on your iPhone. Imagine how brilliant they could be.

So I hope Samsung lives to fight again, and that Apple has to keep releasing amazing smartphones to stay competitive. Then again, the mechanisms of free-market capitalism are pretty reliable at filling competition vacuums, and perhaps we just need to wait for the next Asian success story to take Samsung's place. How about it, Xiaomi?

## Apple's Q1 2015 was most profitable quarter any company has ever had

Apple reported profits of \$18 billion in its latest earnings call, with \$74.6 billion revenue

BY SUSIE OCHS

Apple on 27 January announced its earnings for Q1 2015, revealing that it made \$18 billion in profit in three months. It's not only the best quarter Apple has ever had, it's the best quarter any company has ever had. The jaw-dropping 74.5 million iPhones sold is a big reason behind this success. But a record-shattering \$74.6 billion in revenue wasn't the most interesting part of the earnings conference call, in which Tim Cook took questions from analysts about the rest of Apple's plan for success, and how to keep this momentum going.

### Apple Watch hints

The Apple Watch has a more solid ship date – sometime in April (at least for the US). Cook said in his prepared statement, "Development for Apple Watch is right on schedule, and we expect to be shipping in April. Developers are hard at work on apps, notifications and information summaries that we call Glances, all designed specifically for the watch's user interface. The creativity and software innovation going on around Apple Watch is incredibly exciting, and we can't wait for our customers to experience them when Apple Watch becomes available.

An analyst later pressed for more detail, and Cook took the opportunity to make us jealous – he already has an Apple Watch. "My expectations are very high on it. I'm using it every day, and love it, and I can't live without it. We're making great progress on the development on it, the number of developers that are writing apps for it is impressive and we're seeing some incredible innovation."

Apple sold a record number of iPhones in the quarter, 74.5 million units. That's

23.4 million more than the same quarter last year. Cook doesn't expect the iPhone train to stop rolling anytime soon, either: "I would point out that only a small fraction of the installed base has upgraded, so there's a lot more people within the installed base, but I would also point out that we had the highest number of customers new to iPhone last quarter than any prior launch. And also that the current iPhone line-up experienced the highest Android switcher rate in any of the past three launches in the three previous years."

Cook declined to break out figures of iPhone 6 versus 6 Plus, but he did say this: "What I can tell you is that iPhone 6 was the most popular iPhone last quarter. But obviously to sell 74.5 million, they were really all popular. And all did well. There is clearly a geographic preference difference, where some geos would skew much higher on their preference to iPhone 6 Plus than other geos. So it's not consistent around the world."

Apple's growth in China also contributed to the iPhone 6's successful launch. Despite not being on sale for the full quarter in China (the iPhone 6 launched there in mid-October), Apple saw 100 percent year-on-year growth. Expect China to become a bigger chunk of Apple's revenue over time, too.

"We'll hit 20 [Apple Stores] soon and we're doubling that by mid 2016," Cook said. "Our online revenues in China last quarter were more than the sum of the previous five years."



iPad sales were soft this quarter at 21.4 million, which is 4.6 million fewer than that sold during the same quarter last year. But Apple remains bullish on the iPad's long-term prospects.

First, iPad is attracting new customers: "I see that the first-time buyer rates are very high. By very high, I mean that if you look at some of the developed markets, like the US, Japan and the UK, you would find that 50 percent of the people are buying an iPad for the first time. If you look in China it's over 70 percent. And so when you have that kind of first-time buyer rates, you don't have a saturated market."

People who like their tablets use them a lot, too: "When I look at the usage, the usage is six times our nearest competitor. Usage measured in web browsing is like 71 percent of total tablets."

Over time, Cook thinks people will keep buying iPads, but probably not as often as they tend to upgrade their iPhones. With iPhones getting bigger and MacBook Airs dropping in price last year, the iPad is also getting squeezed from both sides by Apple's own products: "There's probably some level of cannibalisation going on, with the Mac on one side and the phone on the other."

The Mac had a great first quarter, selling 5.5 million, up 14 percent year on year. Globally, PC sales continue to creep down slowly, but the Mac's market share has grown in 34 of the past 35 quarters.

Cook also teased that 2015 would hold big advancements for HealthKit, HomeKit and CarPlay.



# Apple acquires Semetric's Musicmetric

Apple's acquisition of UK company Semetric shows it wants to know more about your listening habits

BY MIKAEL RICKNÄS

Apple has acquired UK firm Semetric and its Musicmetric analytics platform, which could allow the company to keep better track of what its customers listen to.

There is little doubt that Apple has plans to step up its music push following last year's acquisition of the Beats headphone vendor and streaming music service for about \$3 billion. The acquisition of Semetric and Musicmetric hints that Apple has larger plans for its future offerings and associated services.

In early January, Semetric changed its registered address, as recorded at the UK Companies House, to that of Apple Europe. The move was first spotted by Music Ally, which also pointed out that Semetric has a new director: Gene Daniel Levoff of 1 Infinite Loop, Cupertino, California – Apple's global headquarters.



Apple hasn't confirmed the deal and did not immediately respond to a request for comment.

What Apple might use Semetric's platform and know-how for remains to be seen, but Musicmetric would allow it to dig deep into user behaviour. The Musicmetric Pro offering first gives a quick snapshot of how an artist is performing online. It is then possible to drill down to keep track of downloads,

demographics and see what's happening on social networks.

Musicmetric Pro can also be integrated with iTunes (the two firms are not new acquaintances), Spotify, Facebook Insights and Google Analytics data for in-depth analytics.

Integrating Musicmetric would possibly help Apple make its own offerings more attractive to artists and labels, which depend on attracting as many users as possible, but also making them as attractive as possible for labels and artists. Having a strong analytics platform would help with that.

Apple could also use the underlying technology to improve recommendations for users of its services.

In addition to music, Semetric's platform can also be used to analyse the use of television, film, e-book and video game services, which makes the company an even better fit for Apple.

# Patent reveals plans for an Apple GoPro

GoPro shares fall as patent hints at a similar product in the works at Apple

BY CAITLIN MCGARRY

GoPro shareholders may be panicking after Apple's patent application for a wearable camera was approved. One look at Apple's plans shows why – the application details a GoPro-like wearable for action shots and underwater recording. Apple even takes aim at GoPro in the patent filing.

Apple might not ever make a wearable camera, but if it does it'll be a GoPro on steroids. The patent covers a camera that can be mounted to bike helmets and scuba masks or fastened to motorcycles and surfboards. The patent also details

plans for waterproofing so an iPhone could be used for underwater snapshots.

Apple critiqued GoPro's action cameras in the filing, specifically the HD Hero 2 camera sold as part of an 'Outdoor edition' bundle. It said that the Hero 2's single image-capture system causes "excessive wind resistance" and has a large profile that sticks out from the camera "making it more susceptible to damage". Apple aims to create a camera that can be used in handheld-and mounted modes, with high-quality results both ways.



The patent covers an image sensor, optical system and a remote control.

GoPro shares fell by more than 12 percent in light of this news.

# App Store broke sales record on NYD

Apple has announced that 1 January 2015 was the biggest day ever in App Store sales history

BY LEAH YAMSHON

Apple has announced that 1 January 2015 was the “single biggest day ever in App Store sales history”, with customers spending nearly half a million dollars on both apps and in-app purchases.

Apple’s press release went on to boast of record-breaking sales in 2014, too. App Store sales rose 50 percent in 2014 – and that’s just in paid apps and in-app purchases, not including free apps and upgrades – and generated more than \$10 billion in revenue for developers.

Taking a look back, 2014 was a great year for apps, with the range including HealthKit apps that communicate with the iPhone’s M7 or M8 co-processor to deliver your personal data in an easy-to-understand format, and third-party keyboard apps. Plus, some of the games released in 2014 could rival the quality of



console titles, not to mention amazing puzzlers and titles from other genres.

The launch of iOS 8 could have had something to do with this highly successful year. iOS 8 introduced Apple’s Swift programming language and the

Metal graphics technology to developers, giving them different tools to create rich, robust apps more efficiently.

Other campaigns could have contributed to this success, too, such as Apple’s year-end (RED) initiative where all proceeds from specific app purchases went to the Global Fund to fight AIDS. Apple also introduced app bundles to the App Store in 2014, which lets developers package their apps together for users to purchase at a lower price than what those apps would cost if bought individually.

“We’re so proud of the creativity and innovation developers bring to the apps they create for iOS users and that the developer community has now earned over \$25 billion,” said Eddy Cue, Apple’s senior vice president of Internet and Software services.

# Apple sued over iPhone storage space

Apple accused of misrepresenting the amount of user-accessible storage on 16GB iPhones and iPads

BY GREGG KEIZER

A pair of Florida men have sued Apple for allegedly misrepresenting the amount of storage space available to owners of 16GB iPhones and iPads.

Paul Orshan and Christopher Endara accused Apple of “unfair, unlawful and fraudulent business acts or practices”, including false advertising, and asked a California federal judge to designate the lawsuit as a class action so that others can participate.

In the complaint filed on 29 December, Orshan and Endara’s lawyers claim Apple failed to tell buyers that a fifth of the 16GB in low-end iPhones and iPads is

occupied by the operating system and preinstalled apps, leaving consumers less than the full amount for their own content.

“Reasonable consumers do not expect this marked discrepancy between the advertised level of capacity and the available capacity of the devices, as the OS and other storage space unavailable to consumers occupies an extraordinary percentage of their devices’ limited storage capacity,” the complaint states.

By the plaintiff’s calculations, a 16GB iPhone 6 has 13GB of space available to the user, while the 16GB iPhone 6 Plus and 16GB iPad Air have 12.7- and 12.6GB respectively. The portions of

the 16GB inaccessible to users ranged from 19- to 21 percent.

The lawsuit also charges Apple with a strategy that used the disparity between the advertised- and actual user-available storage space to push customers into paying for iCloud premium plans.

The class-action lawsuit is similar to one that targeted Microsoft in 2012 over the available space on Surface tablets.

On its website Apple explains how it calculates storage space on its iOS devices, but has not published figures for user content.

Lawyers for the iOS lawsuit’s plaintiffs have not responded to questions.



# Apple updates OS X Yosemite and iOS 8

OS X Yosemite adoption has been swift, but iOS 8 is running on only 68 percent of iPhones and iPads

BY CAITLIN MCGARRY, GREGG KEIZER, LEAH YAMSHON

**A**pple pushed out OS X Yosemite 10.10.2 and iOS 8.1.3 on 27 January to fix bugs on Macs, iPhones and iPads.

For Yosemite users, 10.10.2 aims to fix the sluggish Wi-Fi issues that 10.10.1 also promised to fix but didn't. Updating to 10.10.2 should also improve iCloud Drive and VoiceOver, and keep Spotlight from grabbing remote email content in search when you have specifically told it not to.

iOS 8.1.3 is said to reduce the amount of storage required to perform a software update. If you were waiting to upgrade from 7 to 8 because your phone didn't have enough space, now may be the time to get onboard. Apple requested just 136MB of space on our iPad for the iOS 8.1.2 download, and 248MB on an iPhone.

The update also aims to fix a glitch that prevents users entering their Apple ID password for Messages and FaceTime, and another that prevents multitasking gestures on the iPad.

Both updates are available for download, with Yosemite 10.10.2 available in the Mac App Store and iOS 8.1.3 by going to *Settings* → *Software Update*.

## OS X Yosemite adoption

Apple's OS X Yosemite continues its rapid pace of adoption since its October release, with uptake exceeding that of any of its predecessors, according to data from analytics vendor Net Applications.

The numbers hint that as Apple's 2013 decision to give away upgrades becomes the norm, future OS X adoption will increase in speed.

In December Yosemite accounted for 45 percent of all instances of OS X tallied by Net Applications, and for the first time became the most popular OS X edition.

By comparison, OS X Mavericks, an October 2013 upgrade, ended December 2014 with a user share of 37 percent.

Mountain Lion, released in 2012 and Apple's last paid upgrade, ended its second year post-launch at 26 percent. Mavericks and Mountain Lion took 4- and 12 months respectively to reach Yosemite's two-month mark.

Although Yosemite had a head start – unlike Mavericks, Yosemite was offered to Mac owners as a beta for several months before launch – the preview no longer was the cause of the gap. The eight-point difference between the two was double the four points provided by Yosemite's beta before official release.

Yosemite's brisk uptake tempo also indicates that even though many have questioned Apple's software quality and called for the company to slow down its release pace, large numbers of Mac owners have continued to upgrade. Net Applications' data tells nothing about customer satisfaction with Yosemite, of course; rolling back to an earlier version after upgrading requires a backup and more time than most people would want to spend.

What's clear is that Apple's bet on free OS X upgrades has been more successful at moving Mac users to the new edition than low-priced upgrades.

## iOS 8 adoption

Apple has shared its latest data on iOS 8 adoption. As of 5 January, 68 percent of iPhones, iPads and iPod touches are running the latest version of Apple's mobile operating system. Apple tracks iOS adoption by looking at devices that access the App Store, and marking which version of iOS is running on each of those devices.



The App Store Distribution data also shows that 29 percent of devices are still running iOS 7, and 4 percent are still clutching to iOS 6 or earlier. Apple's last iOS adoption data was from November 2014, which showed 60 percent of devices had upgraded to iOS 8. An 8 percent uptick in two months is pretty slow, given the sales boost Apple must have seen during the Christmas season.

iOS 8 had a particularly tough time getting off the ground compared to older versions of iOS. iOS 8 saw sky-high installs when it first launched – it hit 46 percent of devices just six days after it launched in September 2014 – but then downloads steadily tapered off. By comparison, iOS 7 hit 74 percent of devices just three months after launch, and quickly became Apple's fastest growing mobile operating system.

There are several theories on why iOS 8 installations are lagging. Bugs plagued early releases – iOS 8.0.1 made some iPhone 6 and iPhone 6 Plus models basically unusable. It continues to have little problems here and there, and some older devices might not be equipped to handle the update even if they are technically compatible.

Or, it could have been the massive size of the install itself, which has significantly reduced since iOS 8.1.3 arrived.

# THE BEST VALUE MAC

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## IF YOU ARE LOOKING FOR A LOW-COST MAC THE £399 MAC MINI AND THE £749 MACBOOK AIR ARE LIKELY TO BE YOUR TOP CHOICES, BUT WHICH OF THE PAIR WILL GIVE YOU THE BEST DEAL? PLUS, iMAC VS MAC MINI – WHICH DESKTOP MAC IS BEST? [By Karen Haslam](#)

**T**he £749 entry-level MacBook Air is almost twice as expensive as the £399 Mac mini, but there is a great deal missing from the Mac mini – not least a mouse, keyboard and display. On the other hand, you may decide there is a better deal to be had if you buy the £799 version of the Mac mini, with its faster processor and larger storage options.

The new entry-level Mac mini and the MacBook Air have a lot in common. The cheapest Mac mini has the same 1.4GHz dual-core processor as the MacBook Air range, for example. The two Macs also share the same Intel HD Graphics 5000 integrated graphics card.

There are three standard Mac mini models and four MacBook Airs, plus a number of build-to-order options. So let's look at the pros and cons of each and offer buying advice to suit your needs.

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### SPECS

Let's start with the MacBook Air. It comes in two different sizes: an 11in model and a 13in. The main and most noticeable difference is the resulting screen size – an 11.6in diagonal on the 11in MacBook compared with a 13.3in diagonal on the 13in model. You'll notice that the aspect ratio is different too: the 11in MacBook Air is 16:9, like a widescreen TV, while the

**Port paradise** With an HDMI port as well as Gigabit Ethernet and Thunderbolt 2, the Mac mini offers more ways to get stuff in and out.



13in is 16:10. This means that there is a little more height in the 13in version, which might be beneficial.

Beyond that there is little difference between the MacBook Airs other than storage capacity and price.

Each offers a 1.4GHz Intel dual-core i5 processor as standard, along with the Intel HD Graphics 5000 integrated graphics and 4GB of RAM. The only choice is between the 128GB or 256GB of flash storage.

There are also build-to-order options for the MacBook Air. You can get it with 8GB of RAM at point of sale for another £80 – and we recommend you do so. You can also swap out the standard 1.4GHz chip for a 1.7GHz dual-core Intel Core i5 for an extra £130. If you think you might need 512GB of flash storage, then that will cost you £240 extra.

And then there's the Mac mini range, which was updated at the end of 2014.

**Portable paradise** The MacBook Air comes with its own keyboard and an integral 11.6in or 13.3in screen.

The mini is sold in three configurations. The cheapest has the same 1.4GHz dual-core Intel Core i5 processor and integrated graphics chip as the MacBook Air and entry-level iMac desktop. It also has a 500GB hard drive. These are essentially the same specs as the £899 iMac, but at a cost of just £399; that's a saving of £500, more than enough to buy a separate monitor and keyboard and mouse.

The other Mac mini models offer quite a step up from the entry-level model, although they lag behind the now discontinued 2012 Mac mini.

The 2.6GHz dual-core i5 Mac mini offers 8GB of RAM, a 1TB hard disk, and Intel Iris Graphics. It costs £569. The RAM can be upgraded to 16GB at point of purchase. There are also options for configuring the Mac mini with flash storage or a faster i7 processor.

The £799 2.8GHz dual-core i5 Mac mini offers 8GB of RAM, a 1TB Fusion Drive (combining a hard drive and flash storage), and Intel Iris Graphics.

These two Mac minis – the 2.6GHz and the 2.8GHz – have comparable



processors to those inside the 13in Retina MacBook Pro, but you can expect the faster flash storage in the MacBooks to give those models a boost.

## Specs verdict

Given the similarities of the specs, it is no surprise that the new Mac mini's processor and graphics performance is similar to that of the MacBook Air.

In our tests the entry-level 2014 Mac mini scored 5401 points in the multi-core speed Geekbench 3 processor/memory test. Back in July, Geekbench 3 indicated an average score of 5392 for the 11in MacBook Air and 5400 for the 13in model we were testing. While those results aren't identical, the difference is mainly due to the Mac mini being tested while running OS X 10.10, while the test MacBook Air device was running 10.9.

We would expect the MacBook Air to be slightly faster than the Mac mini, thanks to its flash storage.

## STORAGE

The storage options vary enormously for the MacBook Air and Mac mini ranges.

The Mac mini features a 500GB hard drive at entry-level, a 1TB hard drive at the mid-range, and a 1TB Fusion Drive at the high end.

The MacBook Air offers the choice of a 128GB or 256GB SSD – this flash storage is considerably faster than the old-fashioned hard drive in the Mac mini.

However, the Fusion Drive option in the top-of-the-range Mac mini offers the best

**Extras** With a keyboard and monitor added, the Mac mini can be a powerful desktop.



of both worlds – the additional storage offered by a hard drive combined with faster flash storage.

The ability to get a 1TB Fusion Drive as standard on the £799 Mac mini is in its favour; you can't upgrade the MacBook Air to a Fusion Drive at all. The most storage you can get in a MacBook Air is 512GB, and that will set you back £240.

## Storage verdict

If you're prepared to pay £799 for your new Mac, the Mac mini with its 1TB Fusion Drive for £799 may well be a better option than the entry-level MacBook Air, with its paltry 128GB of storage. However, you could always buy an external hard

drive to store media files on that might fill up your limited storage; it's pretty simple to run your photo and music library off an external hard drive, for example.

## PORTS

The Mac mini's big plus here is that it includes an HDMI port, making it really easy to plug into your TV, and so a perfect choice if you want a media centre for your living room. While you could use an adaptor to turn the Mini DisplayPort output on the MacBook Air into HDMI, that would come at an extra cost.

Prior to Apple's 2014 upgrade to the Mac mini, FireWire 800 was another port the Mac mini had and the MacBook Air didn't. That, however, is no longer the case. The old MacBook Pro is the only Mac that still features this port.

Other ports on the Mac mini include Gigabit Ethernet, two Thunderbolt 2 ports, four USB 3 ports, the HDMI port, audio in and a headphone port, an IR receiver, and an SDXC card slot.

The ports on the MacBook Air are: one Thunderbolt port, one USB 3 port, and a

**Width-wise** The 11in MacBook Air has a 16:9 aspect ratio, and the 13in model a 16:10.



headphone port. Only the 13in model offers an SDXC card slot.

Crucially the MacBook Air lacks Gigabit Ethernet, so you can only use it wirelessly unless you buy a Thunderbolt or USB to Gigabit adaptor (£25 each).

### Ports verdict

Here the Mac mini has the edge because of its HDMI port, which is great if you're hoping to attach it to your TV. The Mac mini also comes with faster Thunderbolt 2 ports, and Ethernet, although the ports offered by the MacBook Air may be enough for your needs.

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## DISPLAY OPTIONS

The MacBook Air comes with an integrated 11in or 13in display. Screen resolution is 1440x900 for the 13in model and 1366x768 for the 11in.

The 13in version has the usual 16:10 MacBook aspect ratio – a good balance between 16:9 widescreen for full-screen video, and a taller display that aids productivity. The 11in model of the 2014 MacBook Air has a 16:9 display. Unfortunately, the display on both MacBook Airs stands out as the poorest performing of any current Apple product. We measured only 63 percent of the sRGB colour gamut with our Datacolor Spyder4Elite display calibrator, and viewing angles for the twisted-nematic (TN) glossy panel are limited. You could always plug in an external display and use your MacBook Air with that when at your desk.

The Mac mini doesn't come with a display supplied as standard, so you will need either to use one you've already got, or buy one. You can pick up a separate monitor for around £100. Or you could spend more than twice as what you lay out for the Mac

mini itself and buy an Apple Thunderbolt Display for £899.

As mentioned, you can also plug your Mac mini straight into your widescreen TV. However, we wouldn't recommend working on a Mac with a television screen as a monitor, though.

### Display options verdict

The key difference here between the MacBook Air and a Mac mini is the former's integrated display, but given that this display is small and not as good as other Apple screens, you may find yourself factoring in the cost of a display anyway. If you add the cost of a decent display to the price of the lower-cost Mac mini it doesn't look like such a cheap option, but you may want to factor the cost of a decent display into the price of the MacBook Air too.

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## PORTABILITY

The 11in MacBook Air is the lightest Mac you can get, at just 1.08kg. The 13in model isn't much heavier at 1.35kg. The iPad Air 2, for example, weighs 444g, so the 11in MacBook Air is approximately the same weight as two iPad Airs.

The 11in MacBook Air measures 30cm by 19.2cm and is 1.7cm thin, tapering to 0.3cm at its edge. The 13in model is 32cm by 22.7cm and, like the 11in model is 1.7cm thin, tapering to 0.3cm at its edge.

The 2014 Mac mini, on the other hand, is a tiny 20cm square box that's less than 4cm deep. You could probably carry it around in your bag, although you'd also

need to drag around a monitor, mouse and keyboard too. But if it's a desktop Mac you want that takes up very little space, then the Mac mini is perfect.

### Portability verdict

The MacBook Air is clearly more portable than the Mac mini. And while the Mac mini might be light, it's not really one to carry around given its limited use without a monitor.

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## UPGRADABILITY

One of the best things about the 2012 Mac mini was that it was more upgradable than any other Mac. It used to be possible to upgrade both hard drive and RAM with parts purchased separately, rather than having to choose the upgrade options available from Apple at point of purchase.

Sadly the new 2014 Mac mini is not so upgradable. Apple has soldered the RAM in place. However, there is one factor in the Mac mini's favour: you can still upgrade its storage.

iFixit.com gave the old Mac mini a repairability rating of 8 out of 10 in its teardown. The new 2014 Mac mini soldered-on RAM makes it impossible to update it at any time after purchase. iFixit gave the 2014 Mac mini a 6 out of 10.

The MacBook Air ships with only 4GB of RAM; you can boost this to 8GB for an extra £80 when you buy it and we recommend you do so because there will be no opportunity to upgrade later on, because, as with the new Mac mini, the RAM is soldered on. As with the Mac mini, you can upgrade the storage, although doing so would void your warranty. iFixit gives the 2014 MacBook Air a repairability score of 4 out of 10.

**Light as Air** The smaller MacBook Air is the lightest Mac around at just over 1kg, while the 13in model isn't much heavier at 1.35kg.





### Upgradability verdict

The Mac mini used to be the Mac for people who liked to tinker. Not any more. You won't be able to touch the RAM, for example, as it is soldered on.

The MacBook Air is a similarly tricky machine to upgrade, although if iFixit's rating is anything to go by, the Mac mini still has the edge.

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## BEST VALUE

The Mac mini is Apple's cheapest Mac at £399, but you will have to factor in the cost of a monitor, mouse and keyboard. Add even the cheapest monitor (around £150) and the cheapest Apple keyboard and mouse options (£40 each), and you are looking at around £629 altogether.

The cheapest MacBook is the £749 11in MacBook Air, with a 1.4GHz processor, 4GB of memory and a 128GB SSD. The entry-level laptop is almost twice the price of the entry-level Mac mini. For £50 more you could get the ultimate Mac mini with a

faster 2.8GHz processor, 8GB of memory and a 1TB Fusion Drive.

### Best value verdict

The price of the £399 Mac mini – along with a monitor, mouse and keyboard – is comparable to the £749 MacBook Air with its 11in monitor. That model has the same spec as the Mac mini and you get a built-in display. However, any display you buy to use with the Mac mini is likely to

be much larger than the MacBook Air's 11in or 13in options, so we reckon the Mac mini has the edge there.

If you have the budget for a £749 MacBook Air and already own a screen, we recommend spending the money instead on the 2.8GHz Mac mini, which costs £50 more at £799 and includes 8GB of memory and a 1TB Fusion Drive as standard. That's assuming that you don't need a portable Mac, though.

Possibly the best value way to buy a Mac is to purchase it second-hand. There are a variety of ways you can do this. Apple's Refurbished store (at [tinyurl.com/5pdvvo](http://tinyurl.com/5pdvvo)) sells Macs that have been returned (if there was a fault it will have been rectified and the Mac still has a one-year warranty). You may also find a good deal on eBay or on *Macworld's* own mResell site ([mresell.macworld.co.uk](http://mresell.macworld.co.uk)), where we buy and sell old Macs, iPads and iPhones.

**Which is the cheapest of them all?** The entry-level Mac mini for £399.



## BEST DESKTOP MAC: iMac vs Mac mini

If you are in the market for a desktop Mac, you may be wondering whether to buy an iMac or a Mac mini. The Mac Pro is also a possibility, but as that's such a very high-end Mac, with a very high price, we'll consider just the iMac and the Mac mini here.

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## SPECS

There are six different iMacs and three different Mac minis available with a number of build-to-order options.

The iMac is an all-in-one desktop computer with an integrated display. Screen sizes available include 21.5in and 27in (a 21.5in and 27in screen diagonal respectively), and there's a variety of chip speeds (all processors are Intel's Haswell generation), hard-drive sizes, graphics cards and RAM options.

Last year Apple introduced the 21.5in iMac, with 1.4GHz dual-core processor and 8GB of memory (not upgradable, even at point of purchase, as it is soldered on), Intel HD Graphics 5000 and a 500GB hard drive. It costs £899.

Joining the iMac line-up at the end of 2014 was the Retina 5K iMac. At the other end of the scale from the £899 iMac, this 27in model offers a 3.5GHz quad-core i5 processor with 8GB of RAM as standard (you can add 16GB or 32GB of RAM and a 4GHz quad-core Intel i7 at point of purchase – for a price). The Retina 5K will cost you £1,999, more than double the price of the entry-level model, and even more if you spec it up to the max.

There are four other standard versions of the iMac to choose between. These were introduced in October 2013 and have not been updated by Apple since.

The standard chip in those models is an Intel quad-core i5 that ranges from 2.7GHz to 3.4GHz (although there is a configuration option of a 3.5GHz quad-core Intel i7). Each comes with 8GB of RAM as standard (configurable to 18GB or 32GB at the high end) and a 1TB hard drive as standard (configurable to 3TB, an SSD option or a Fusion Drive, which combines an SSD and a hard drive).

One of these standard models offers the Intel Iris Pro Graphics card – a step up from the Intel HD Graphics 5000 in the £899 model. The rest offer variants of the nVidia GeForce GT series (750M, 755M and 775M). This dedicated graphics card has its own 1GB of memory on most models (2GB on the high-end model, configurable to 4GB).

All the iMacs feature an SDXC card slot, four USB 3 ports, two Thunderbolt ports

**Eye-stretchers** There are six iMac models, all supplied with a 21.5in or 27in screen.



(Thunderbolt 2 on the Retina model), Gigabit Ethernet and a Mini DisplayPort output. All come with an Apple Wireless Keyboard and Magic Mouse.

The 2014 Mac mini is a different beast altogether. It fits in a tiny 20cm square box less than 4cm deep. There is no monitor, mouse or keyboard included.

Updated at the end of 2014, the Mac mini is now sold in three configurations.

The entry-level Mac mini and the entry-level iMac introduced in mid 2014 have much in common. The cheapest Mac mini has the same 1.4GHz dual-core Intel Core i5 chip and integrated graphics chip as the entry-level iMac. It also features a 500GB hard drive. For what are essentially the same specs as the £899 iMac, you pay just £399 for the Mac mini – that's a saving of £500, more than enough to buy a separate monitor, keyboard and mouse.

The other Mac mini models include one with a 2.6GHz dual-core i5 chip, 8GB of RAM, a 1TB hard disk, and Intel Iris Graphics. It costs £569. At point of purchase it is possible to upgrade the RAM to 16GB, and add flash storage or a faster i7 processor.

The 2.8GHz dual-core i5 Mac mini comes with 8GB of RAM, a 1TB Fusion Drive and Intel Iris Graphics. It costs £799.

### Specs verdict

In terms of specs the iMac is a better deal than the Mac mini because of its more

modern processors, bigger RAM and better graphics. It also offers an integrated monitor. However, if you look to the top-of-the-range Mac mini models, the specs are impressive for the price.

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### STORAGE

The iMac and Mac mini storage options are very similar. Each offers a 500GB hard drive at entry-level, a 1TB hard drive at the mid-range and a 1TB Fusion Drive at the high end.

Being able to pick up a Fusion Drive as standard on the £799 Mac mini (it's a £160 option for the mid-range Mac mini and a £200 option for the £399 model) is undoubtedly a point in its favour. Having a Fusion Drive will make a huge difference to your Mac's performance.

The iMac range also offers Fusion Drive options. You can add a Fusion Drive to the entry-level iMac for £200 – worth doing because with the Fusion Drive the machine is as good as the next step up and will still cost less. The Fusion Drive upgrade is £160 across the other iMacs.

### Storage verdict

The storage upgrade options are the same, but the starting price is so different that you can essentially get a pretty decent Mac mini for less than the cost of the entry-level iMac.

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### PORTS

When it comes to ports, the Mac mini has the advantage of including an HDMI, which makes it really easy to plug it into your TV to act as a media centre for your living room. You could use an adaptor to turn the Mini



**Bigger picture** Add the cost of a good display and the Mac mini is not so cheap.

DisplayPort output on the iMac into HDMI, but that would cost extra.

Other ports on the Mac mini include Gigabit Ethernet, two Thunderbolt 2 ports, four USB 3 ports, the HDMI port, audio in and a headphone port, an IR receiver and an SDXC card slot.

The ports on the iMac are: Gigabit Ethernet, two Thunderbolt (only the Retina iMac has Thunderbolt 2), four USB 3, a headphone, a Kensington lock slot and an SDXC card slot.

### Ports verdict

Here again the Mac mini has something of an edge because of its HDMI port, which is great if you were hoping to attach it to your TV. However, you wouldn't need to connect the iMac to your TV in the first place as it comes with a screen as standard, which takes us to our next point.



## DISPLAY OPTIONS

**To boggle at** The Retina screen of the top-range iMac displays 14.7 million pixels.

The iMac comes with an integrated 21.5in or 27in display. The ultimate iMac has a Retina display boasting an astonishing 5120x2880 pixels – a total of 14.7 million.

The other iMac displays may not be as ground-breaking, but they are still good quality. They feature IPS (in-plane switching) technology, which makes a huge difference to colour vibrancy and reproduction. Earlier iMac models were criticised by some for too reflective a display. The 2013 model remedied this and the Retina iMac went one step further, adding a special film that improves off-axis viewing.

However, if you are a designer and need colour accuracy, you might be better off with another display. The good news here is you can plug another display into the back of your iMac and have two displays.

The Mac mini doesn't come with a display at all, so if you don't have one already, you'll need to buy one separately. You can pick up a monitor for around £100, or you could double the cost of the Mac mini by buying an Apple Thunderbolt Display for £899.

Although you can plug your Mac mini into your TV, we wouldn't recommend a TV screen as your working monitor.

**Buy with an eye to the future** Because upgrading an iMac is not for the faint of heart.

### Display options verdict

The key difference here is the presence of the integrated display on the iMac. If you add the cost of a decent display to the price of the lower-cost Mac mini it doesn't look like such a cheap option.

## UPGRADABILITY

One of the 2012 Mac mini's best features was its enormous upgradability. You could not only upgrade the hard drive and the RAM, but do so at any time with parts purchased separately.

The new 2014 Mac mini is very different. Apple has soldered the RAM in place, so it can't be changed. You can, however, still upgrade the storage.

iFixit.com gave the old Mac mini a reparability rating of 8 out of 10; it gave the 2014 Mac mini a 6 out of 10.

When it comes to the iMac, upgrading is no job for the faint-hearted. If you aren't prepared to pull your Mac apart, you may be wise to fully spec the iMac out when you buy it. There are a number of build-to-order options, so if you think you may need more RAM or a bigger hard drive, or an SSD at a later date, get it put in when







**Basic bargain** The entry-level Mac mini's starting price is so low it has to be considered.

Beyond those two iMacs there isn't really a comparable model to the Mac mini range.

### Best value verdict

We'd recommend the entry-level £399 Mac mini over the iMac. But beyond that it gets a bit murky.

If you are considering only the entry-level Mac mini, the price of the iMac is significantly higher. You could equip the cheaper Mac with a monitor, mouse and keyboard, and still have cash left over. So the Mac mini is undoubtedly the cheapest way to buy a Mac.

But if it's cheap you are after, it's worth considering the £749 MacBook Air, which has the same specs as the entry-level iMac and Mac mini – 4GB of memory and 1.4GHz dual-core Intel i5 chip. It also has an Intel HD Graphics 5000. The only difference is that the MacBook Air ships with 128GB of flash storage – which will make it faster than the Mac mini – and an 11in display, which may be big enough for your needs. That entry-level MacBook Air costs £350 more than the Mac mini.

you buy it. However, you will pay much more for the extra RAM and storage doing it like this than if you do it yourself.

You can't add your own RAM to the 21in iMac without hassle. You'll need to take it apart and cut through a lot of adhesive to get to the memory slots, which are hidden behind the logic board. So unless you really like to get your hands dirty, you are stuck with Apple's base 8GB or expensive build-to-order options. As for other upgrades, don't even go there. The CPU is soldered to the logic board, so it can't be replaced if something goes wrong.

Upgrading the RAM in a 27in iMac is easier. According to iFixit's teardown of the 27in iMac, the hard drive and CPU can be replaced, although you'll need to cut the adhesive. The Retina iMac scored 5 out of 10 for repairability on iFixit, the 21.5in iMacs even lower: 2 out of 5 for the entry-level 21in iMac.

### Upgradability verdict

The Mac mini used to be for people who liked to tinker. No more. The RAM, for example, is untouchable.

If you buy an iMac (especially the 21.5in model), your specification is pretty well fixed. There again, it has better specs than the Mac mini to begin with.

expensive monitor to go with your Mac mini, although you may already own that monitor. So in terms of the entry-level iMac and Mac mini, it certainly looks like the Mac mini is the best value.

The iMacs and Mac minis are less comparable outside the entry-level category, as the Mac mini uses dual-core chips while the iMac has a quad-core. So even if you take the most highly specced Mac mini – the £799, 2.8GHz dual-core – and compare it to the £1,049 2.7GHz iMac, the latter has a quad-core chip and Intel Iris Pro Graphics (the Mac mini has Intel Iris Graphics). The one thing in that Mac mini's favour is its 1TB Fusion Drive, which will help speed it up. The iMac will cost you £250 more than the Mac mini in this case, and another £160 if you wanted to add the Fusion Drive. That's at least £250 for a quad-core processor, which is essentially the only difference, apart from the display.

**Mod quad** iMacs have a quad-core chip, as well as more RAM and better graphics than the Mac mini.



## BEST VALUE

The Mac mini is Apple's cheapest Mac at £399 although it lacks monitor, mouse and keyboard. Add even the cheapest monitor (£150) and Apple keyboard and mouse options (£40 each), and the total price is around £629. That makes it comparable to the £899 iMac, which has the same spec as the Mac mini. To compare like for like, you'd need a more

# MAC TRICKS

## 10 THINGS YOU DIDN'T KNOW YOUR MAC COULD DO



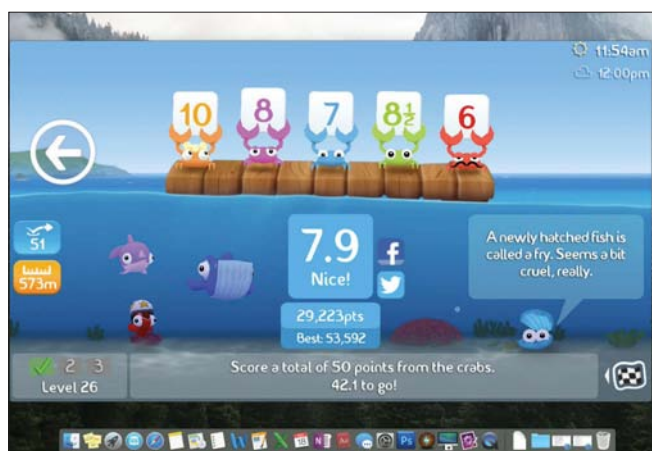
MACS ARE INCREDIBLE COMPUTERS BUT WITH A LITTLE SECRET KNOWLEDGE AND A HANDFUL OF ADD-IN APPS YOU'LL BE STUNNED BY WHAT THEY'RE REALLY CAPABLE OF **BY KEIR THOMAS**

### DISPLAY IPAD AND IPHONE GAMEPLAY

Beaming iOS games to your TV is possible via an Apple TV box and AirPlay, and is great for sharing your fun with others, but what if you want to show iOS output on your Mac's screen?

If your Mac is running Yosemite or later, and your device is running iOS 8 and has a Lightning USB connector, then you've got everything you need. Just attach the iOS device to your Mac, then start QuickTime Player on the Mac. Click *File* → *New Movie Recording*, and you'll see QuickTime Player attempt to record via your Mac's iSight camera. However, if you click the small down arrow next to the record button on the controller, you can select your iOS device under the Camera and Microphone headings.

There's no need to actually record anything, and moving the mouse cursor out of the window will hide the controls and window border. You can even switch the QuickTime Player window to full-screen in the usual way by clicking the green maximise button.



Not got the hardware or software required? Try using AirServer, which runs on a Mac or PC and works with any iOS device capable of AirPlay (iOS 4.2 or later).

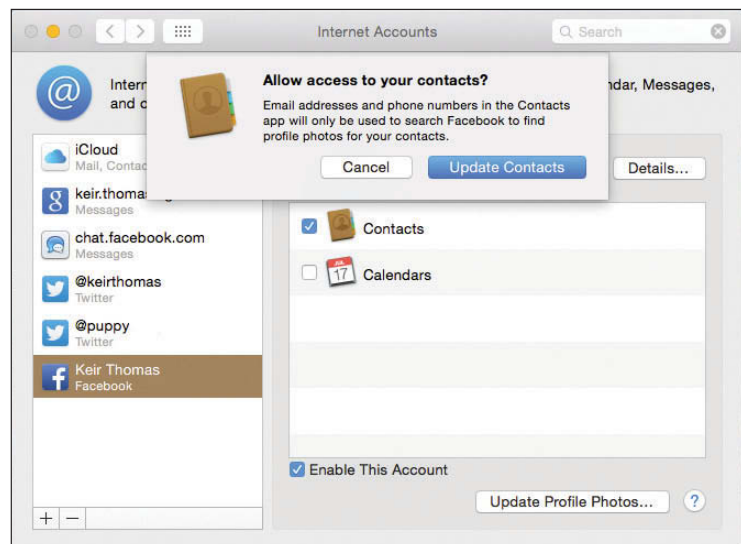
## RUN WINDOWS APPS NATIVELY

There's still a handful of Windows-only apps around that many people absolutely rely on, such as Quicken financial software.

A solution here is provided in the form of CrossOver Mac, which is a commercial version of the Wine project, which aims to recreate the Windows under-the-hood components on both Linux and Mac.

It's not cheap at £38, but there's a 14-day free trial available, and it's worth noting that CrossOver Mac can even run many Windows games.

If you fancy a free-of-charge approach, then try the more hands-on WineBottler.



## GRAB CONTACT PHOTOS FROM FACEBOOK

If you've signed into Facebook or Twitter on your Mac, then you can raid the social networks' profile pictures to update your iCloud address book.

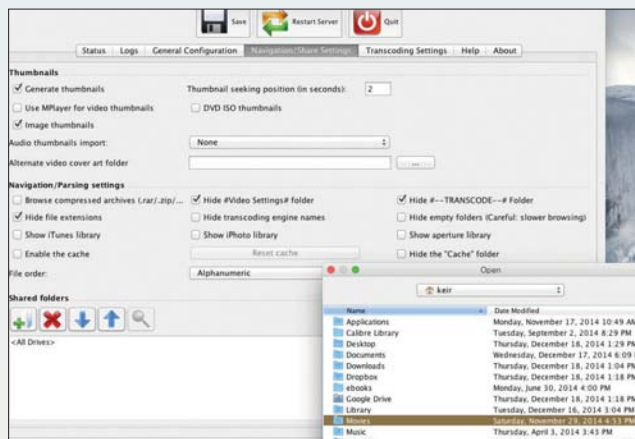
To do this, open System Preferences, click Internet Accounts, then select your Facebook or Twitter account at the left. Then click the Update Profile Photos button.

## BEAM MOVIES TO YOUR TELLY – WITHOUT AIRPLAY

AirPlay is a terrific way of viewing movies on your TV or listening to songs, but it requires an Apple TV. If you've a modern internet-compatible TV, though, you might find it's compatible with DLNA, which means you can beam files directly to it over the network. Alternatively, most games consoles are DLNA-compatible.

To use DLNA on your Mac, you'll need an app like PS3 Media Server, which regardless of name should work with all DLNA-compatible TVs and is free although you have to install Java (you'll be prompted during installation).

Once the app is installed you'll need to point it at where your video or audio files are stored on your Mac by clicking the Navigation/Share Settings tab, and then clicking the Restart



Server button. Your Mac should then appear automatically on your TV or PS3 in the list of available devices to play from.



## USE ANDROID GAMES AND APPS

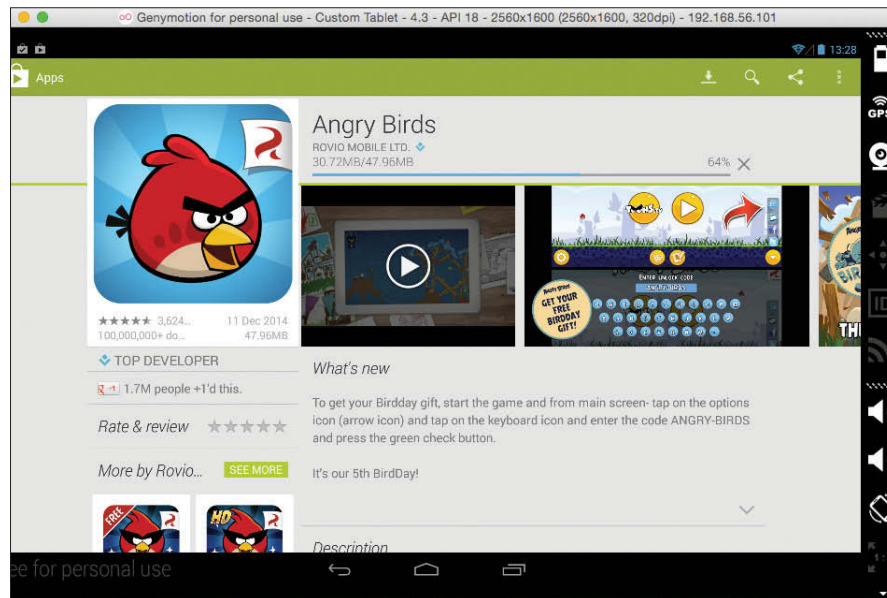
By installing GenyMotion on your Mac, which is free for personal use, you can use a virtual Android tablet.

Click the Add button on the GenyMotion toolbar and then select Custom Tablet in the Device Model drop-down list. Choose Custom tablet – 4.3 – API 18 – 2560x1600.

Once the emulated Android installation has been set up, you'll need to add in a few hacks in order to make it into a full Android system.

Start your emulated tablet by double-clicking its entry in the list so it boots to the unlock screen. Then on your Mac download the ARM translation software, and drop the zip file you downloaded on top of the tablet emulation program window (don't unzip it first!).

Click OK to install, wait until a second dialog box appears, then close and restart your emulated tablet (if you see a failure



message, just restart anyway). Then on your Mac, download the Google Apps zip and again drop it over the emulated tablet window, and follow the instructions before restarting (again, don't worry if you see a failure message).

When you restart the tablet, you'll then need to follow the instructions in order to set it up as a new device, but you should find that Play Store is now available and will allow you to install apps and games.

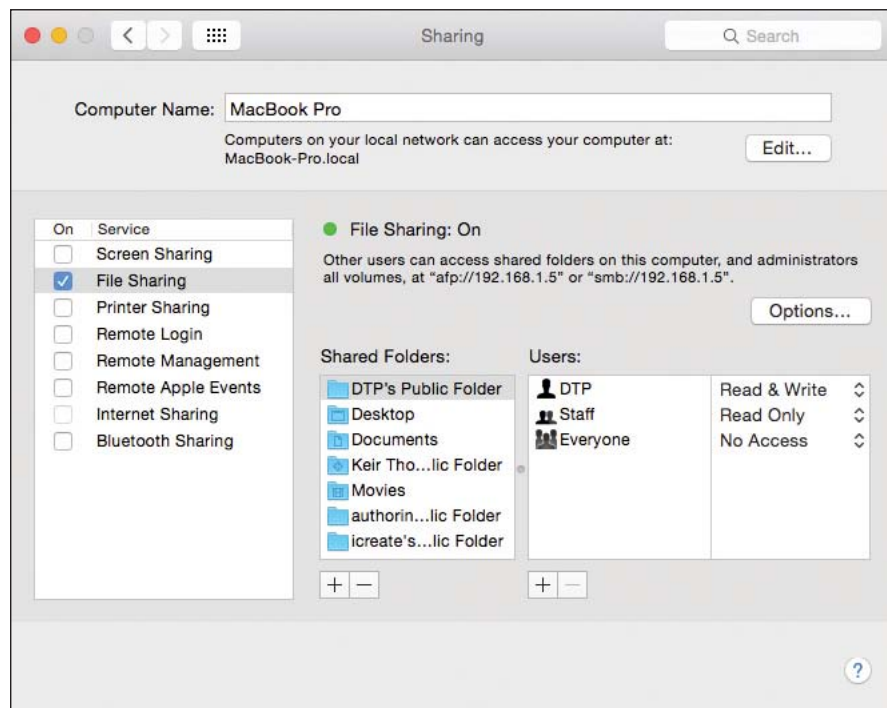
## CREATE A FILE SERVER

An old Mac you no longer use you can be turned into a file server for other Macs and Windows computers to store data on – useful for backup purposes, especially if you attach an external hard disk.

Just open System Preferences, click *Sharing*, and then put a tick alongside *File Sharing*. You'll be shown an address to use. On a Mac that wants to save files on your new server, open Finder and click *Go* → *Connect To Server*, then type the *afp://* address provided.

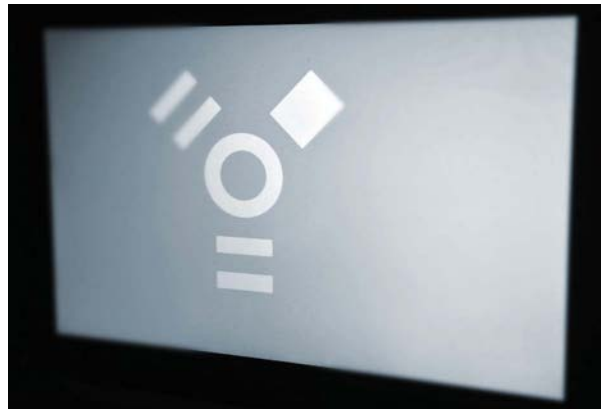
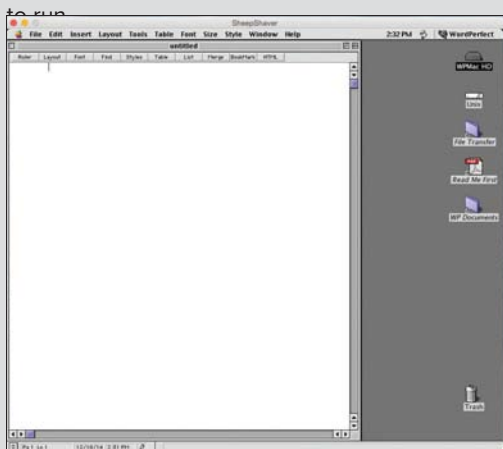
On a Windows computer, open the Start menu and in the Search field type two backslashes and just the part of the address following the *afp://* part of the list (something like *\\192.168.1.5*).

Your users can log in using the Mac's username and password if they don't mind seeing each other's files, or you can use the Users & Groups component of System Preferences to create a separate account for each user.



## RUN VINTAGE MAC OS

If you want a nostalgia blast, you can run older versions of Mac OS on your Mac. Apple's made the older Mac OS 7 and 9 releases free of charge and although you can get System 9 directly from them ([tinyurl.com/m3q3www](http://tinyurl.com/m3q3www)), System 7 has been lost to the mists of time. However, a quick Google will reveal it for download at several sites. The equally free Sheep Shaver software is able to run them. Getting it all working can be time-consuming, however, and by Googling you may find some ready-made operating system images you can install and double-click



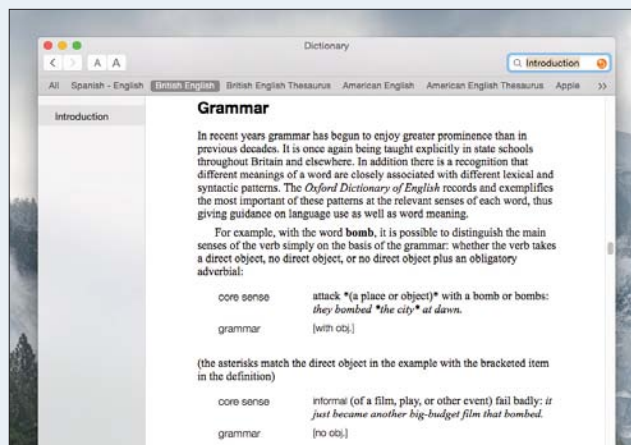
## RESCUE FILES FROM A DAMAGED MAC

If a Mac is misbehaving to the point where it won't boot, but you believe the hard disk is still intact, then you might be able to use another Mac to access its files.

Turn on the Mac that's broken and immediately hold down the T key. This will boot it into Target Disk Mode, which should work even if the Mac can't boot normally. Then connect the Mac to the second Mac via a FireWire or Thunderbolt cable. The damaged Mac will appear in Finder as an external drive, just like a USB stick.

## SPEAK WHAT YOU WANT

This is an old trick but one that's been given a new lease of life in recent versions of OS X because of extremely realistic voice synthesis. To make your Mac say what you type, open a Terminal window (you'll find it in the Utilities folder of Finder), then type 'say' and hit Enter. Then type what you want to say and hit Enter after each line. When you've finished, just close the Terminal window.



## TEACH YOURSELF DEEP ENGLISH

Most people know that Macs include a very capable Dictionary app, which can be found in the Applications list. But what most people don't know is that it not only contains the entire dictionary, but also introductory pages explaining how the English language is structured and how dictionaries are created. To access it, just open the Dictionary app, then click *Go* → *Front/Back Matter*.



# Setting up a new Mac

Getting a new Apple Mac computer is cause for celebration. Lou Hattersley shows how to get started

**S**etting up a new Mac should be easy, quick and above all fun. It's not every day you get a brand new Apple computer, so it's best to start off on the right foot.

In this article we're going to look at setting up and getting started with a new Mac. We'll look at switching on the computer, running through the setup process, entering your account details and transferring data from an old Mac.

## Starting your new Mac

Starting a new Mac couldn't be easier. Unbox it and plug in the power supply (most MacBooks carry some charge from when they were tested, but it's

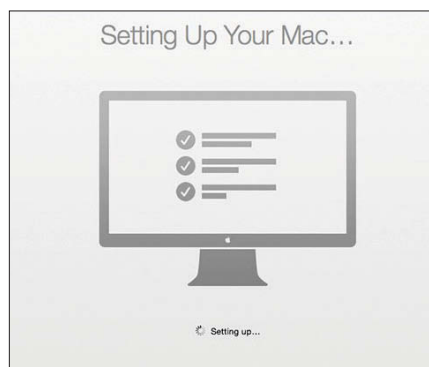
best to plug it in anyway). If you've got a new Mac mini or brand new Mac Pro, then you'll also need to attach a monitor, and either a USB keyboard or mouse. Make sure that you have batteries

inside the Apple Magic Trackpad, Magic Mouse or Apple Wireless Keyboard.

Press the Power button!

## Setup Assistant

When an Apple Mac runs for the first time, it launches a program called Setup Assistant. This is used to help you set up your Mac, connect to the internet and guide you through the account creation process. It also runs you through the legal documents and helps you decide on your privacy settings (these affect apps such as Find My Friends). Each screen offers selections and a Continue button. Here are the screens on Setup Assistant:





- **Welcome to your new Mac** This screen displays a Map. Select a country near you and press *Continue*. Select your keyboard. Check that the keyboard is set to British (not US). You may need to click *Show All* to reveal the British keyboard layout.

- **Choose your Wi-Fi Network**

You need to connect to a network. These will typically be a Wi-Fi network. Choose your network's SSID (name) and enter the password. If you don't know your Wi-Fi password it may be written on the side of your router.

- **Transfer information to this Mac** If you are upgrading from an old Mac, you can use the Time Machine backup to transfer information to your new Mac. This uses a program called Migration Assistant. It's worth noting that you can run Migration Assistant at any time, you don't need to do it just now. So click on *Not Now* and *Continue*.



## We'll look at switching on the computer, running through the setup process, entering your account details and transferring data from an old Mac

- **Enable Location Services** Location Services enables apps to locate your position on earth. You have to give each app permission to do this, and Apple apps and services, like Maps and Find My Friends make good use of this. We think it's a good idea to tick Enable Location Services on My Mac and *Continue*, but it's up to you.

- **Setting up your Mac with Apple ID** It's now time to enter your Apple ID and Password. This is the same Apple ID that you use to make purchases from the App Store. It is an email address, and usually one that ends in 'icloud.com'.

If you don't have an Apple ID, then it's a good idea to create one by clicking on Create a Free Apple ID. You'll need to provide a credit card to get an Apple ID, but it can be used to locate missing Apple Mac computers, provide a good password lock, and it enables you to download new (often free) apps from the Mac App Store. But

if you don't fancy getting an Apple ID you can click *Skip* and sign up for one later.

- **Terms and Conditions** You'll now be asked to read and agree to the Terms and Conditions. Read through these and click *Agree*, then *Agree* again.

- **Set up iCloud** Next you'll be asked to set up iCloud. This requires you to have signed in with your Apple ID. We think iCloud is fantastic. It syncs up your contacts, calendars, Mail accounts, web browser information, reminders, notes and provides you with 5GB of storage space to store documents in the new iCloud Drive. Enable *Set Up iCloud* on this Mac and click *Continue*.

- **Setting up FaceTime and Messages** The next window asks whether you want to use your email for FaceTime and Messages. Your iCloud email will appear by default, but if you have registered other emails with Apple they may appear.

Tick the checkbox next to email addresses you want to use with FaceTime and Messages and click *Continue*.

- **Find My Mac** Now you'll be asked whether you want to use iCloud with Find My Mac. This is a service Apple runs which helps you to locate lost Macs. A Mac you own will send its location when you ask it from another device, or from the iCloud.com website when you sign in to it. We think it's a great idea to tick this on and click *Continue*.

- **Accounts** You'll next be asked to set up your account. You need to fill out the Full Name field, this will give you an Account Name and Password fields. Makes sure you pick a good password, but also one you can remember. In this screen you will also see two options: *Allow My Apple ID To Reset This User's Password*; *Require Password When Logging In*.

We think it's a good idea to keep both of these ticked on. Click *Continue*.



- **Select your Time Zone** If you agreed to Location Services earlier, you can just leave the Set Time Zone Automatically Using Current Location and click on *Continue*. This way the Mac will change time zone if you enter a new time zone area. Otherwise pick the time zone you want to use and click *Continue*.

- **Diagnostics and Usage**

This is a new feature in OS X Yosemite. In this window Apple requests whether you want to share information with Apple and other app developers. There are two options here:

*Send diagnostics & usage data to Apple*  
*Share crash data with app developers*

The first option is ticked by default, the second you'll have to tick manually (if you agree to sharing crash data with developers). We share our crash data with developers because we want them to be able to improve the apps we use, but it depends on your privacy concerns. Click *Continue* when you are ready to move on

- **Should you register your new Mac with Apple?** Finally, you can choose to Register your Mac with Apple. We tend to register my Macs with Apple, and they already send me marketing emails (which are the few marketing emails we welcome). But you can click *Skip* if you don't want to get marketing from Apple.

That's it. The final screen will simply say *Thank You*. Click *Continue* and start using your Mac. The best thing you can do before going any further is to click on the App Store app and click on *Updates*. Now click on *Update All*. There will almost certainly have been some new software released since the Apple Mac left the factory, and updating the software before you go any further makes sure you are off to a good start.



# The first 10 apps to install on your new Mac

Glenn Fleishman reveals 10 apps that will enhance your user experience

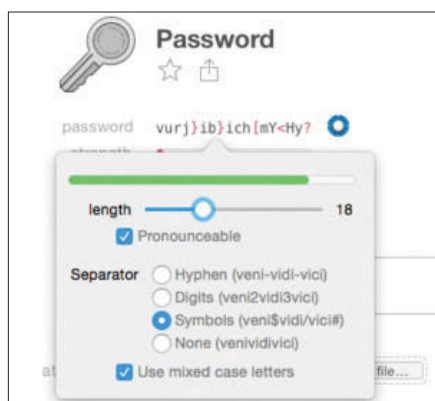
It used to be all the rage to photograph in excruciating detail the ‘unboxing’ of a new piece of gear, especially hardware that few people (or no-one else) yet had. This was great, but it’s sort of like a wedding: the event is relatively brief and the important stuff comes afterwards,

as you spend years together. Likewise, unboxing a new Macintosh may be exciting, especially if it’s a surprise. But the important part comes next. While Apple includes some software, and offers more to download for free via the Mac App Store, what else should a new user or a fresh system get?

We have 10 suggestions that will make your life better by shaving off the irritations that remain in OS X Yosemite and in Apple’s bundled software. A new Mac user will be happier than otherwise, while a veteran user looking to refresh a system will find the time and effort savings rewarding as well.







(tinyurl.com/ohfhjmm, £39.99) handles that with ease. It can create random password according to rules you set, or those absurd ones imposed by sites, and then securely store them for you.

That would be perfectly dandy, but not terribly useful if that's all it did. However, 1Password also comes with web browser plug-ins for Safari, Chrome and Firefox, which let you invoke the app while visiting a site. Tap a keystroke, and it either prefills a username, password, and more, if there's only one match; or lets you choose among multiple accounts for a site. When creating an account, the password generator can be invoked in the same way.

1Password also stores and can fill in one or more identities (address information), as well as credit card details. Versions are available for Windows, iOS, and Android, and a password database can be synced among them. (The App Store version is required for iCloud sync with OS X and iOS.)

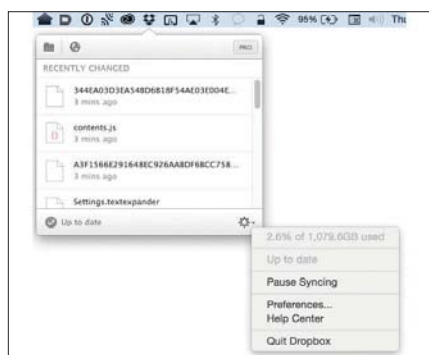
The similarly featured LastPass (tinyurl.com/mj77n44, free) is an alternative for those who want to be able to gain access to passwords via website, which 1Password doesn't offer.

## 5. Dropbox

Keeping files up to date among multiple computers was a pain for many years. It wasn't until Dropbox (dropbox.com, free tier with 2- to 16 GB; 1TB Dropbox Pro, £7.69 per month or £79 per year) appeared – a harbinger of cloud storage – that it became simple. Dropbox has a single folder into which you can place anything, and it's copied to its

internet storage in your account, while also synchronised to any computer logged into the same account. (You can selectively omit specific subfolders on each machine.)

That would be enough, but it also offers two kinds of sharing. Shared

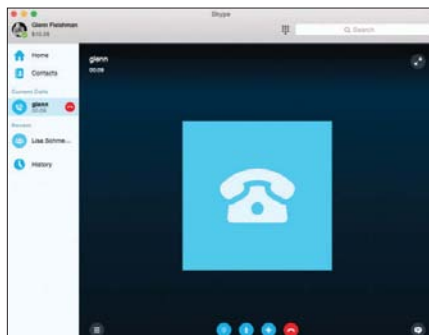


folders sync the contents to any members who have joined the folder. A shared link allows any recipient to download a file or folder, or browse a folder's contents.

Because Dropbox keeps a copy centrally, it keeps track of every change. Older versions and even deleted files are available for up to 30 days after a change or removal, and an upgrade to Dropbox Pro, called Extended Version History, extends that to a year. Dropbox's iOS client lets you browse its cloud-stored versions, forward files, and download them to the app or open in other apps.

## 6. Skype

You already have FaceTime available on your computer and iOS devices, so why would you need Skype (skype.com/en, free)? Because not everyone you know has a Mac, iPhone or iPad, and because FaceTime doesn't come with a calling plan, even though in Yosemite, OS X can access your iPhone



to make and receive calls to landlines and mobile numbers.

Skype has a tattered history of Mac updates, but it remains the lingua franca for person-to-person and group internet telephone calls. The service also has inexpensive calling plans for making unlimited phone calls to specific countries (such as the US), and cheap per-minute rates without a plan or to countries not included in a plan. You can pay for one or more incoming 'real' phone numbers, too, placing them in countries from which you routinely receive calls, making it a local call for residents there.

It offers audio only and video calls, as well as screen sharing, file transfer, and instant messaging, along with SMS. I've used Skype for years as my main incoming and outgoing business line to avoid the fixed cost, and as it's typically higher quality than a mobile call.

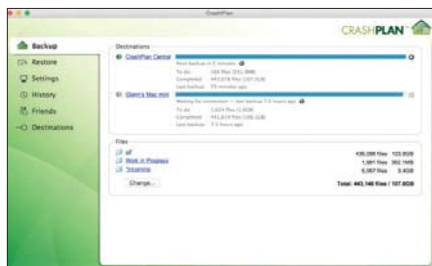
## 7. CrashPlan

CrashPlan (code42.com) can back up any selection of files to a locally connected drive, a local-area network volume, a peer's drive elsewhere, or its cloud service – in any combination. Only the cloud storage comes with a fee attached, \$5 (£3.30) per month individual, \$15 (£9.90) per month family. The latter subscription option lets you pull in any of your otherwise backup-adverse relatives without them having to manage the details of a separate account themselves.

The peer-to-peer option allows you to push your encrypted files to someone else's drive anywhere on the internet. That other person gives you a code, and off your files go onto their backup volume or a separate volume you could provide, offering true offsite backup without a recurring fee.

CrashPlan isn't a full-system clone, though. For that, Time Machine or Super Duper (shirt-pocket.com, £20.40) is a better option. Rather, CrashPlan is best at archiving your documents, preferences, and applications, and can store endless revisions of the same files for recovering older drafts.

We have about 1.5TB stored with CrashPlan's cloud service across our own

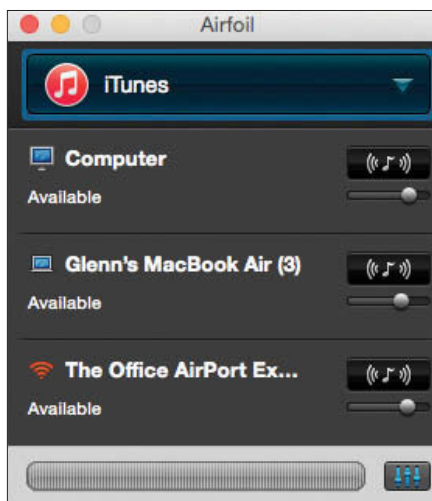


computers, and have relied on restoring files from the cloud and local drives many times, both through its Mac interface (including over 600GB after a recent drive failure) and its iOS app ([tinyurl.com/mzw3kmy](http://tinyurl.com/mzw3kmy), free).

CrashPlan's major down side is that it continues to require Java, an extra installation in OS X for years. Installing Java for CrashPlan is safe, because it's not enabled for use on the web without extra steps. Still, if that's a stumbling block, Backblaze (unlimited storage, \$5 (£3.30) per month for each computer) is a good option.

## 8. Airfoil

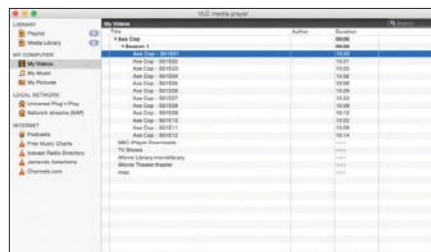
AirPlay is one of the best things about Apple's ecosystem of audiovisual-friendly devices, and many strictly audio devices support AirPlay audio playback, too. But AirPlay has a number of limits. For example, iTunes is the only Apple software that has a specific AirPlay option, which includes simultaneous playback to multiple devices. Otherwise, you're limited to choosing a single device from Sound preferences to which to shunt all system audio.



Airfoil ([rogueamoeba.com](http://rogueamoeba.com), \$29 (£19)) works around this limit by letting you take just the audio output of any software or audio input device and route it to one or more AirPlay-compatible receivers, including an Apple TV or AirPort Express. Better still, Rogue Amoeba offers Airfoil Speakers apps, free software for receiving Airfoil audio for Mac, Windows, Android, iOS, and Linux

## 9. VLC

VLC ([videolan.org](http://videolan.org), free) is the Swiss Army knife of video playback software. QuickTime Player can handle most popular formats, but for those it can't there's VLC. It can play internet streaming video of all sorts, read various disc formats, and convert some files it can't read. If you deal with older file formats, say, those used by people that eschew



H.264 because of patent issues, or video created or distributed for Windows and Unix variants, VLC is a one-stop shop.

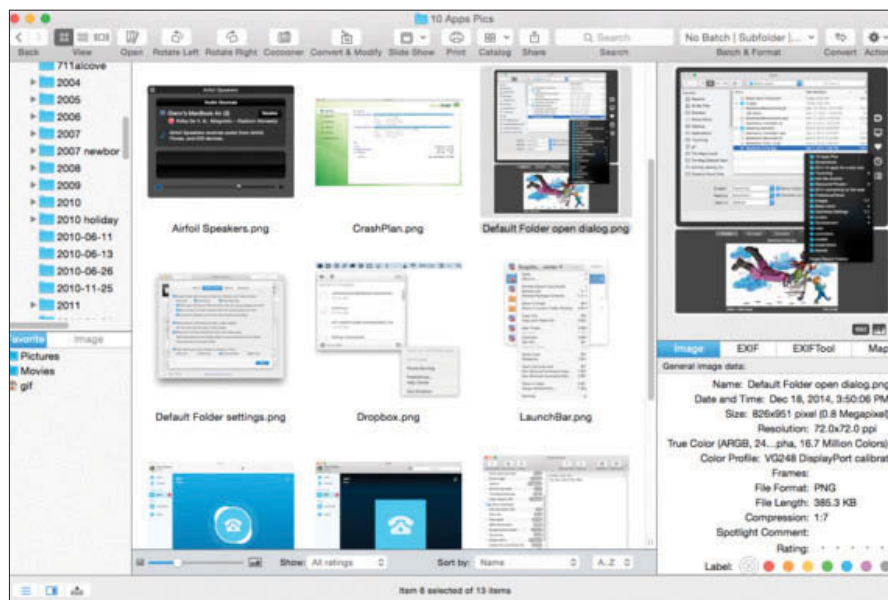
Beyond video file support, VLC can open and convert tons of audio formats,

which you might find in sorting through several decades of rubbish on the web and in your own digital history, depending on your age. It can also directly open YouTube URLs, subscribe to podcasts, make video playlists, and play Internet radio stations from a large, built-in list.

## 10. GraphicConverter

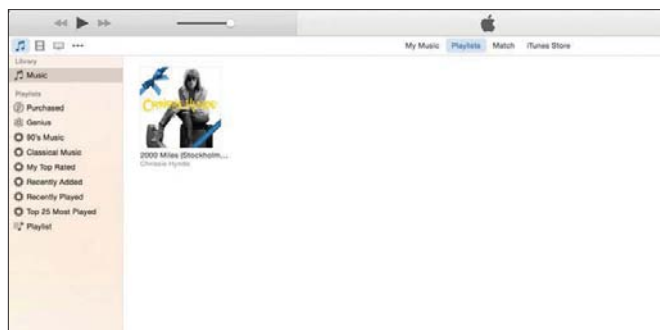
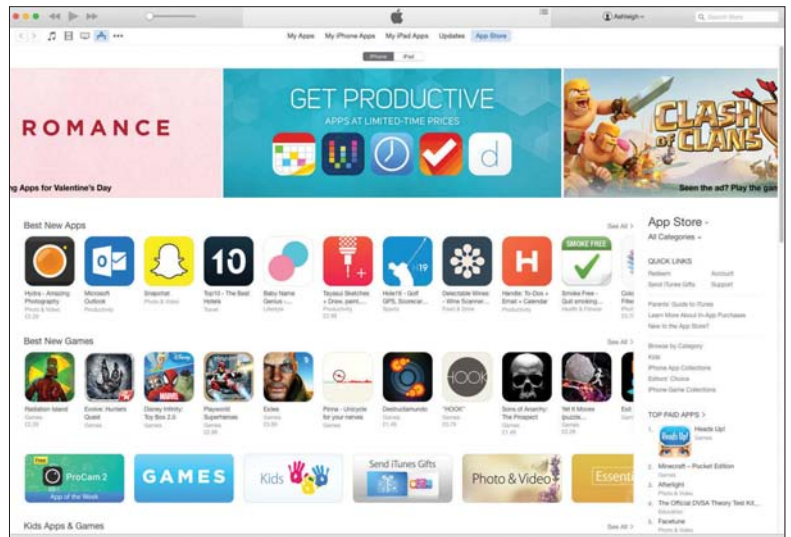
As VLC is to video (and audio) formats, GraphicConverter ([lemkesoft.de](http://lemkesoft.de), €34.95 (£26.30)) is to image files. While Apple's Preview offers a decent subset of image viewing and manipulation controls, GraphicConverter has more in common with Photoshop. It can open just about anything, offers photographic (non-linear levels) and image-editing (gradients, fills, and like) tools, and the basics such as cropping, canvas resizing, and up- and downsampling. We often use GraphicConverter's Browse command to view images in a directory, where we can preview and see file data, as well as rename or delete them.

You can directly import images from scanners and cameras (including in RAW format), and GraphicConverter can upload directly to Google+, Flickr, and other services. And if you need to process a number of images – converting a folder from TIFF to JPEG, for instance – the program has simple batch processing, with more advanced options available to those who need them.



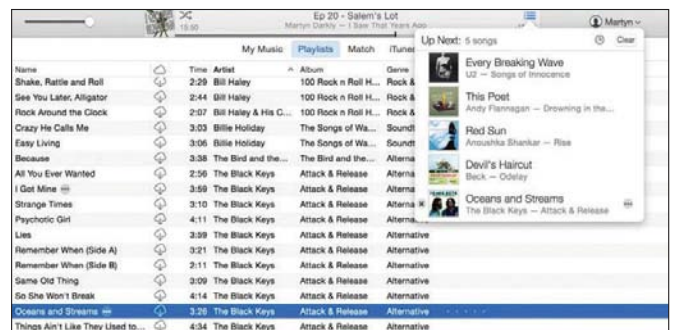
# iTunes tips and tricks

Martyn Cassely's tips will help you get more out of iTunes 12



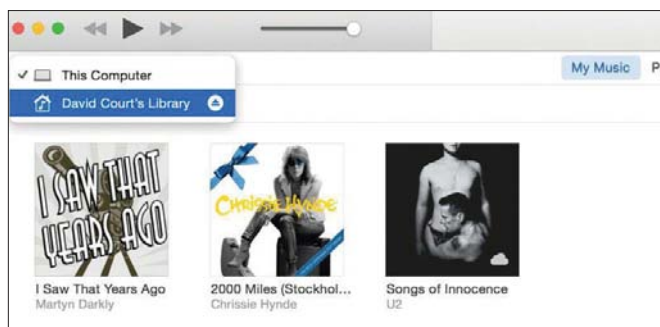
## 1. Show sidebar

Apple has been hiding the sidebar in recent versions of iTunes. To get it back in iTunes 12 simply select the Playlists options at the top of the screen and it will appear on the left.



## 2. Temporary playlists

Right-click a track and select the option Add to Up Next, and the song will be placed in the queue. To see what songs are lined up, go to the play windows at the top of iTunes and click on the three horizontal lines to see the playlist.



## 3. Home Sharing

To set this up, go into iTunes and select **File** → **Home Sharing** → **Turn on Home Sharing** and enter your Apple ID. Now repeat the process on your other machine, then you'll see a little house appear in the top left of the main iTunes window. Click this to see the content on other machines.



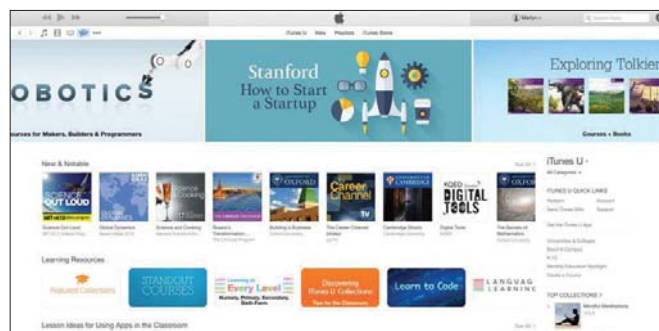
## 4. Family Sharing

Go to System Preferences, choose **iCloud** → **Set up Family** and follow the instructions. Then you can add the Apple IDs of your loved ones and make their content available to your Mac or iOS device.



## 5. Use Siri to find what song is playing

If you're out and about and suddenly hear a song that you must have, but don't know what it's called, Siri can help you. Simply ask "what song is this?" and the digital assistant will search its data banks and return with the results. Then you can click on the iTunes store link and the track will be purchased and added to your library.



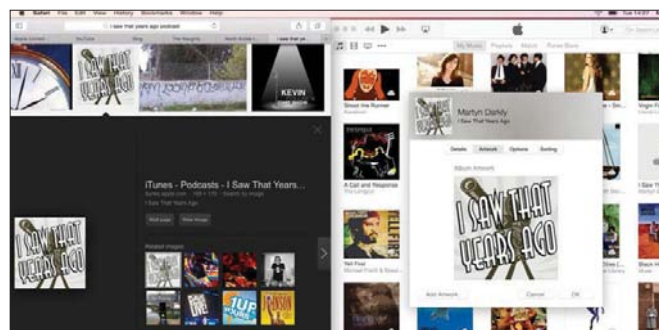
## 6. iTunes University

In this separate store, you'll find a wealth of courses from renowned educational bodies such as Oxford University. Each course is broken into several lectures, with many including notes that you can read on your iPad or print out. The best part is that they are all completely free.



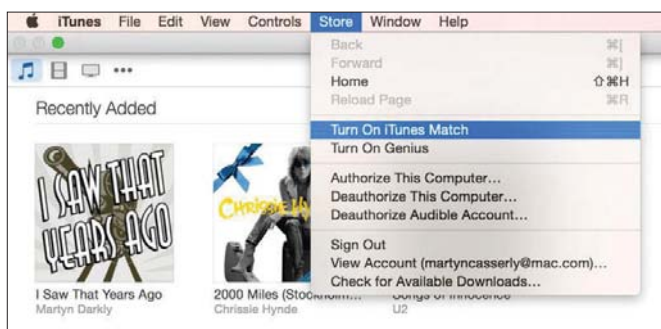
## 7. Album artwork

Click **Store** → **Sign** and enter your Apple ID and password. Now click **iTunes** → **Preferences** → **Store** and ensure there is a tick in the 'Share details about your library with Apple' option. Now **Ctrl+click** any album and choose **Get Album Artwork**.



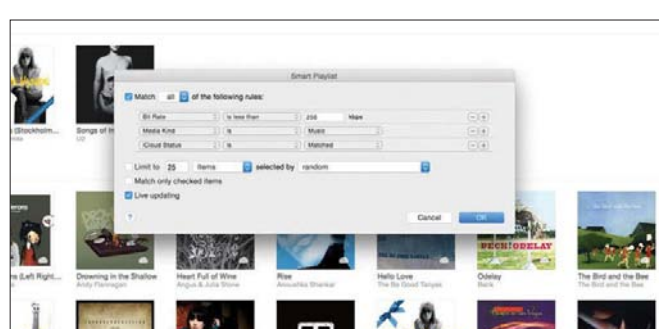
## 8. Manually add artwork

Click an album cover and select all the tracks in this list beneath it. Choose **File** → **Get Info** (or press ⌘+I). Open Safari and search for the image in Google Image Search. Drag the image directly from Safari to the Artwork box to add it to iTunes.



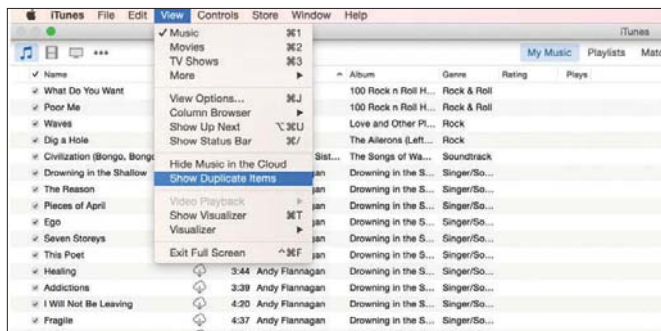
## 9. iTunes Match

If you have iTunes Match, you can use it to upgrade music you have imported from a CD. Delete a track but don't click the **Also Delete This Song** from iCloud button. The song will still be in your iTunes library. Click the iCloud icon to redownload it. The download will be at the full quality.



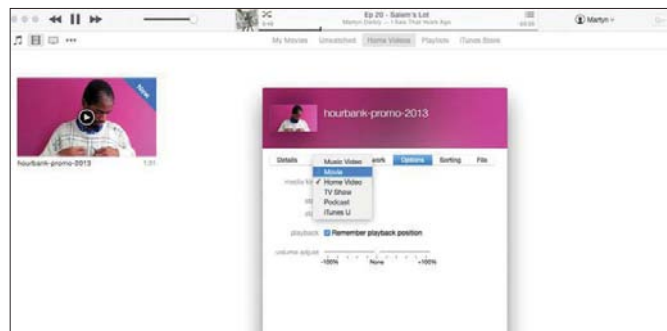
## 10. Create a playlist to update to iTunes Match

Click on **File** → **New** → **Smart Playlist**. Set Match to all of the following: Bitrate is less than 256kb/s; Media Kind is Music; iCloud Status is Matched. Click **OK**. Repeat the process but replace the last line with **iCloud Status is Purchased**.



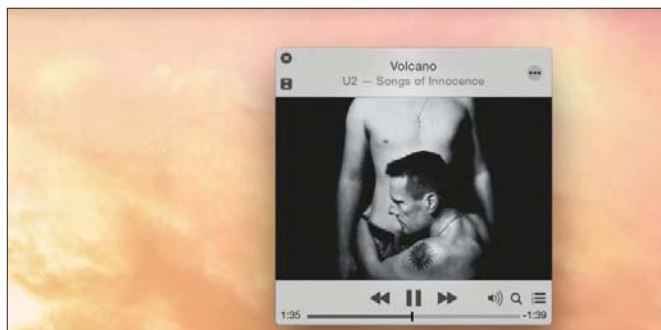
## 11. Show duplicate items

Choose *My Music* and click on the drop-down menu on the right side of the screen, just beneath the Search Library box, then select *Songs*. Choose *View* → *Show Duplicate Items*, to see just the songs of which there are more than one copy. Now you can go through and manually delete the unwanted tracks.



## 12. Change media kind

If you add movies to iTunes to watch, then you're probably wondering why they're always added to Home Movies. You can change them by clicking on the file and choosing *File* → *Get Info*. Choose *Options* and use the Media Kind window to move it over to Movies (for Films) or TV Shows.



## 13. Use the MiniPlayer

Go up to the artwork displayed in the play window at the top of the iTunes app and you'll notice a couple of small squares appear, click on this to switch to the player. Otherwise you can go in iTunes to *Window* → *Switch to MiniPlayer*.

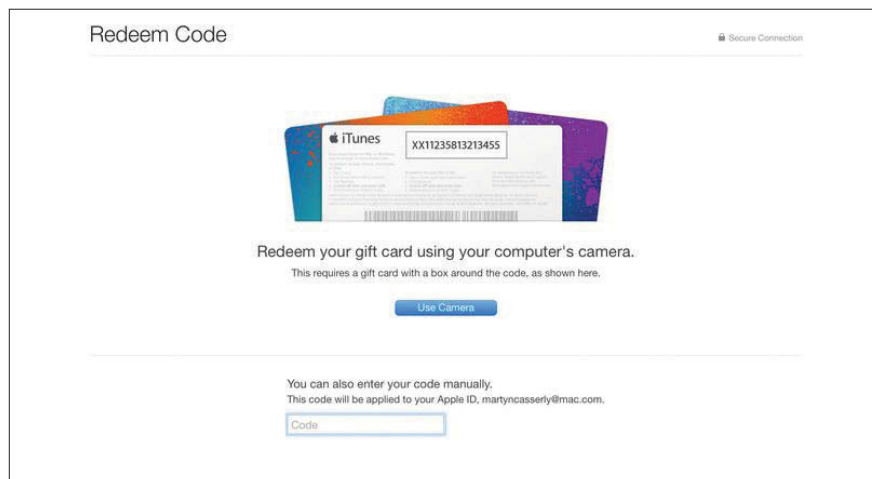


## 14. Use multiple AirPlay devices

If you have multiple AirPlay devices (such as an Apple TV and AirPlay speaker), you can play music through all devices at once. Click *AirPlay* and *Multiple*, and tick all the devices you want to use.

## 15. Redeem a payment card with iSight

If you have an iTunes store card, you can redeem it by holding up the card to your iSight camera (instead of tapping in the code). Apple iTunes will scan the card using the camera and redeem it for you automatically. Open the iTunes Store and click on *Redeem* and select *Redeem with Camera*.



# Mac security options

Topher Kessler reveals the four Mac security options everyone should know

## Enable the OS X firewall

The firewall in OS X is a network filter that allows you to control which programs and services can accept incoming connections. While classic firewalls do this on a per-port basis, OS X's can work on a per-application or per-service basis, giving you more flexibility.

To set up your firewall, go to the Security & Privacy system preferences, click on the Firewall tab, and then unlock the preference pane, after which you will be able to click the Turn On Firewall button. This basic option is the best for most purposes, but you can also click the Firewall Options button to see the specific settings for each application, as well as access some extra features, such as stealth mode and an option for blocking all connections.

The firewall is a good option to enable if you're connected to a public Wi-Fi network, such as one at a cafe, library, or other hotspot. For home networks, you can usually rely on your router's firewall for protection, though, enabling the OS X firewall for added security generally won't cause additional problems.

## Enable FileVault

FileVault is the full-disk encryption routine in OS X that will secure all files on the drive. To enable it, go to the FileVault tab of the Security & Privacy system preference, unlock the preference, and click *Turn On FileVault*. When you do this you'll be asked to choose the user accounts that are authorized to unlock the disk. Click *Continue* and your Mac will begin encrypting your drive.

Full disk encryption is primarily useful for protecting a stolen Mac. When your drive is unlocked, files on it can be read. However, before it's unlocked, all data on the drive will be scrambled. This prevents data recovery by unauthorised third parties, who might try to access it using Target Disk mode on your Mac or by



removing your Mac's hard drive and attaching it to another computer.

## Password management

If you use numerous online services regularly, then you will (or should) have different credentials for each one. These may be difficult to remember. In OS X, you have a built-in alternative for managing passwords called the keychain.

The keychain is enabled by default to store your various passwords for online services, email accounts, and other authentication routines. Whenever you see a checkbox for saving your password, or in a drop-down menu when using Safari, this is OS X asking you to store these passwords in an encrypted file called the login keychain.

This can be managed using the Keychain Access utility (/Applications/Utilities). In most cases, there's little need to use this. Instead, use the option to save your passwords and OS X will automatically enter them when needed.

## Locking and locating

A final couple of options for protecting your Mac include securing your computer when you have to leave it unattended

and enabling remote access to it – not only to interact with it from afar, but also to track and lock it down, if needed.

You set up the first of these options in the General tab of the Security & Privacy system preference. Just enable the Require Password option and choose Immediately or five seconds from the pop-up menu and you'll be required to enter a password to use your Mac after it's gone to sleep or the screen saver has started. The shorter the time interval you use in this feature, the better. Just close the lid to lock the system.

For Find My Mac, if your system is ever stolen you can log into iCloud.com or use the Find My iPhone app on an iOS device to locate your device, send it a command to lock it down unless a password is supplied, have it issue a sound (also a great option for locating a misplaced iOS device), or remotely wipe the device.

Overall, while Apple can do very little to prevent your computer from being stolen, OS X does its best to protect the data it holds as well as offers a chance that you can pinpoint its location. With these options enabled, you can be sure your Mac's data is as safe as possible, with little to no inconvenience for you.



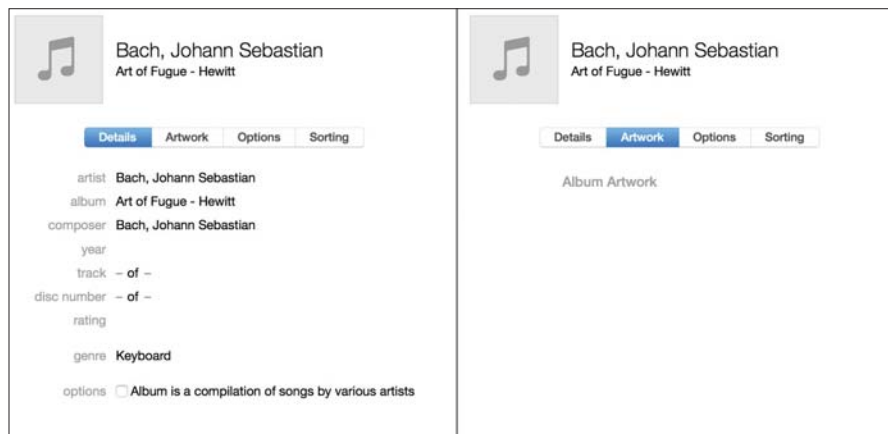
# Ask the iTunes Guy

Kirk McElhearn demystifies artwork, wish lists, and alerts in iTunes 12

With increasing numbers of users updating to iTunes 12, we've been getting a huge amount of questions about how to use this new version. This month, we look at questions about iTunes 12. We discuss adding artwork to files, deleting artwork, and changes to the iTunes Store's Wish List and My Alerts section.

## Q: How do I add album art to my music and movies in iTunes 12?

**A:** iTunes 12 has changed the Info window that appears when you select one or more items and press  $\mathbb{I}$ . The old window had an Artwork well, where you could either drag or paste graphics to add album art to your files. In iTunes 12, the Info window is different.



Note that the window you see displays information about files that already have album art, but it doesn't show that album art when you select multiple items. (The iTunes 11 Info window didn't show graphics in the Artwork well either.) There are now three ways to add album art to your files:

- Click the artwork square at the top-left of the window – the one with the musical notes – and it becomes highlighted. You can paste a graphic that you've copied to your clipboard by pressing  $\mathbb{V}$  or you can just drag a graphic onto that square.
- Click the Artwork tab and paste a graphic, or drag it onto that pane.
- Click the Artwork tab, click *Add Artwork*, choose a file that's anywhere on your Mac, such as one you've downloaded, and click *OK*.

These techniques work for multiple items, such as the songs on an album, or for single items, such as a movie or TV show.

## Q: How can I delete artwork from all the tracks of an album in iTunes 12

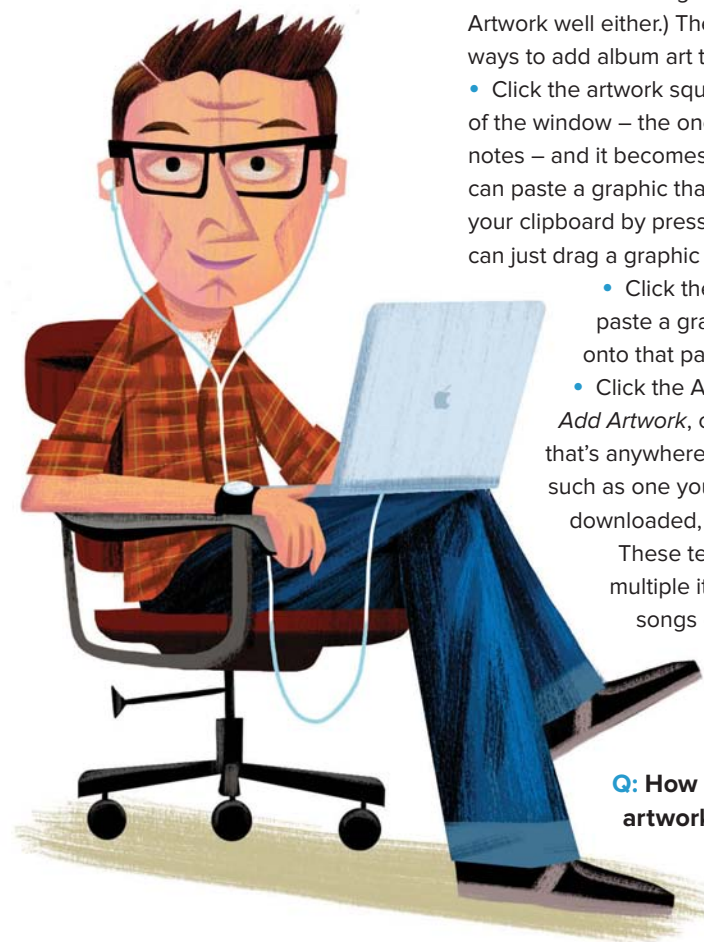
**iTunes 12 Info window** On the left is the window that shows a summary and the main tags of your files. On the right is the Artwork tab of that window.

**A:** As we said in the previous answer, iTunes 11's Info window had an Artwork well. If you checked a box next to it and then clicked *OK*, that told iTunes to reset that metadata to what was in the well. If the well was empty, iTunes would delete the artwork.

In iTunes 12, since you can't see the artwork when you display the Info window for multiple items, it doesn't look like there's any way to delete artwork. The same is the case on the Artwork tab in the Info window; there's no artwork visible, and no sign of anything that lets you delete the existing artwork.

The trick is to click the artwork square in the Info window, then press the *Delete* key. That square then looks like the figure to the right. Click *OK* and iTunes will remove the artwork. Click *Cancel* if you change your mind.

**Q: I used to have several hundred tracks in my iTunes Store Wish List, but after upgrading to iTunes 12, all but 32 of those tracks have disappeared. I don't see any button that says 'See All' or 'Show Entire List' or anything of**



**Bach, Johann Sebastian**  
Art of Fugue - Hewitt

Details Artwork Options Sorting

artist Bach, Johann Sebastian  
album Art of Fugue - Hewitt  
composer Bach, Johann Sebastian  
year  
track – of 21  
rating  
genre Keyboard  
options ☐ Album is a compilation of songs by various artists

Add Field Cancel OK

**When you click** The artwork square, then press the Delete key, iTunes sort of shows you that the artwork is being deleted.

**Alerts' section of the iTunes Store is gone. I am disappointed by this, as that was the best way I had of knowing when artists I like have released new stuff.**

**A:** Several readers wrote in about this as it seems to be a popular section of the iTunes Store.

First, you can set up alerts for any artist by going to their page – to get there click on the artist's name on an album page, for example – and then look for the tiny share button near the top of the page. Click that button and then choose *Alert Me*.

As the reader pointed out, there used to be a link for My Alerts, but the latest redesign of the iTunes Store removed that. If you go to the main page of the Music store and scroll down a bit, you'll see a New From Your Artists section, which seems to include both artists for whom you've created alerts, and artists whose music you've bought in the past. Click the See All link at the right of that section to see a full page of new releases by your artists. You cannot, however, see only new music from artists who you've asked to be alerted about.

Interestingly, on my New From Your Artists page, there's one item that shows as Purchased. You'd think they wouldn't tell me about something new that I've already purchased.

**the sort. Is there any way to get those tracks to appear again?**

**A:** Apple did something strange with the iTunes Store Wish List in iTunes 12. Not

albums you've added to the Wish List display. (I didn't test with other types of content, but it's likely the same.)

We admit that this is confusing, especially since Apple wants you to add

**In iTunes 12, since you can't see the artwork when you display the Info window for multiple items, it doesn't look like there's any way to delete artwork**

only is the display different, but it shows, as you say, just 32 tracks. However, the tracks you saved aren't lost. If you delete some of them – hover over a track and then click the X icon at the top-right corner – and then press ⌘-R to reload the Wish List page, you'll still see 32 tracks. In other words, the Wish List only shows the most recent 32 tracks in your Wish List.

We also tested this with albums. And it's the same story as only the last 32

tracks to the Wish List – notably if you use iTunes Radio – so that you buy more music. There's also no Buy All button, which seems counter-productive, but that's been gone for a while now.

**Q: I recently updated to iTunes 12, and it seems that now the 'My**

**Delete item** Hover your cursor over an item to remove it from the iTunes Store Wish List.

**Wish List**

**Songs**

Vocalise, Op. 34, ... \$1.29  
San Francisco Sympho...

A Concord Symph... \$1.29  
San Francisco Sympho...

Rosamunde, Op. 2... \$1.29  
San Francisco Sympho...

La plus que lente, ... \$1.29  
San Francisco Sympho...



# The real Apple Watch revolution

Taptics, haptics and the body fantastic.. Brian S. Hall reports

**H**aptic technology uses force upon the skin to deliver real-time tactile feedback. These physical sensations are created by tiny motors called actuators. Done right, haptics can mimic the feeling of a pin prick by a wearable that tracks your blood sugar, simulate the plucking of virtual guitar strings on a tablet screen, or recreate the physical recoil of a phaser from your favourite game controller.

To date, the technology has been held back by a lack of real-time accuracy. This is why even though we are surrounded by computer screens, widespread consumer use of haptics has been limited. Several companies are working to improve accuracy, so that you literally feel exactly what you expect when you tap an image on your screen or open a virtual door inside an Oculus (oculus.com) game. Apple, however, has found a way to make haptics work now, leveraging what this tech can do in its present stage and clearing a path for making haptics a part of our everyday life.

## The feel of Apple Watch

For its beautiful Watch, Apple has constructed a modified iOS user interface. The company developed an innovative

'digital crown' as an entirely new context-optimised input method. It is the haptics, however, that may prove most useful, possibly even revolutionary. This is not a bold prediction. Consider how Apple is already marketing what the tech giant calls its "most personal" device.

Apple has created what it calls a "taptic engine" to deliver physical sensations to your wrist. According to the company: "The Taptic Engine creates a discreet, sophisticated, and nuanced experience by engaging more of your senses.

"It also enables some entirely new, intimate ways for you to communicate with other Apple Watch wearers. You can get someone's attention with a gentle tap. Or even send something as personal as your heartbeat."

With surprisingly little fanfare, Apple has embraced a new user interface. When you pay with Apple Watch, you will both hear and 'feel' a confirmation. According to the tech giant, a "gentle tap" on the device can be sent to

another Watch wearer, who will feel the touch on their wrist. Is this a reminder? A nag? Longing? Answer: this is an entirely new form of human-to-human communications. It's no surprise that Apple Watch taps can be customised for different people and different interactions.

What might app developers create using the taptic engine? Right now, that's difficult to say. An Apple spokesperson told us that the company is not yet ready to announce "any plans or details regarding the WatchKit SDK," though hinted such plans would be forthcoming.

It's easy to imagine the near-term possibilities. Perhaps a Watch weather app will zap you when you are about to leave the house without an umbrella. You may feel an annoying pinch as you pass the grocery store on the way home from work, a physical reminder to not forget the milk. An hour before lunch, a short series of hot taps could mean the (second-generation) Apple Watch senses

**Apple has found a way to make haptics work now, leveraging what this tech can do in its present stage and making haptics a part of our daily life**





**Tactile feedback** Apple Watch is the touchscreen device that can touch you back.

just another mode of learning, expect haptics to spread to educational software, interactive exhibits and be used for teaching music, among other use cases.

### Healing touch

It's not all fun and games, of course. Haptics can replicate human touch. That means it can convey human emotions. The BabyBe system, for example, was designed to transmit a mother's heartbeat to her premature baby.

Premature babies are typically kept in isolation for the first several weeks of life. This is medically necessary but disrupts and potentially limits the emotional and physical bond between child and mother. The BabyBe system helps mitigate this by using haptics to replicate the mother's heartbeat, as if the baby was laying on her chest.

No doubt a similar system will be devised to enable grandparents to hug their grandchild from miles away, or allow travelling parents to stay physically connected with their children.

With computers surrounding us from the time we wake to the time we go to sleep, the potential use cases for haptics is huge. We can't know exactly where this technology takes us, but it's already creating new modes of truly human interactions previously not possible. Our body is the new user interface.

your blood sugar is too low, discreetly reminding you to eat something.

### Can touch this

A caress on the arm means something different than a stern squeeze of the shoulder or a pat on the back. These minor physical actions convey a great deal: love, concern, gratitude,



### Game on

Forget buzzing controllers. Haptics for gesture controls, alerts, even pain, could revolutionize gaming. Recently, Japanese tech firm Miraisens showed off its haptic technology for use in virtual reality gaming. The firm's small, coin-shaped device delivers real-time tactile feedback for users immersed inside a virtual 3D

## With computers surrounding us from the time we wake to the time we go to sleep, the potential use cases for haptics is huge

disappointment. As haptic technology evolves, our bodies are poised to become the next computing interface.

Fitness trackers, smartwatches, even *Star Trek: The Next Generation*-like wearables on our shirt will use haptics to alert us, remind us, and share something uniquely human, a secret between friends and loved ones, perhaps. These interactions will come in the form of vibrations, pressure, repetition, customized force, a distinctive sequence of touches and tactile feedback.

Last year, Apple was awarded a patent for a haptic feedback system for use on multi-touch surfaces. The patent listed a "virtual keyboard" as an example of how this system might work.

world, tricking the gamer into thinking they are pushing a physical button or actually feeling a gold coin or magic sword, for example. Since gaming is really



**Touch this** Tactile Rendering of 3D Features on Touch Surfaces.

# 10 fascinating Apple facts

Ashleigh Allsopp reveals 10 surprising facts about the tech giant

**Y**ou all know that Apple is the company behind iPhones, iPads, iPods, Macs and more, but did you know that it once also built a games console, one of its many flops in its 38-year history? We've gathered together 10 of the most fascinating and surprising facts about Apple, so read on to brush up on your knowledge of the much-loved company.

## 1. Apple's third cofounder

We'll start with one that those who are very familiar with Apple may already know, but we still think is a fact that many, many people won't. Apple had three co-founders: Steve Jobs, Steve Wozniak and the third who many people won't have heard of: Ronald Wayne. Wayne left the company just 12 days after it was founded, and sold his 10 per cent share for just \$800 plus an additional payout of \$1,500. The most crushing part is that his share would now be worth more than \$60 billion. Thankfully, now 80 years old, Wayne says that he has no regrets.

## 2. Lisa landfill

Around 2,700 of Apple's Lisa computers are buried in a landfill in Utah, after the product flopped in 1983.

## 3. Upside down Apple

For many years, Apple's laptops had the glowing Apple logo upside down while in use, but the logo was flipped in the 1990s, reportedly so that it would look better in Hollywood movies.

Originally, Apple thought that the Apple logo should be facing the right way when the user went to open the laptop, because otherwise people would attempt to open it from the wrong side.

## 4. Apple's earnings

In the first quarter of 2014, Apple earned more than Google, Facebook and Amazon combined.



9.

## 5. Apple's cash

Apple's \$150bn cash reserve could buy Facebook. Alternatively, it could purchase Netflix, Telsa, Twitter, Dropbox, Pandora and Spotify. Yes, all of them.

## 6. Jony Ive's T-shirt

Jonathan Ive has worn what appears to be the same G-Star T-Shirt in every Apple product introduction video since 2000.

## 7. Tim Cook

Apple's Tim Cook is the first openly gay CEO of a Fortune 500 company.

## 8. Apple I

The Apple I first sold for \$666.66, but it has not for satanic reasons. Apple

co-founder Steve Wozniak has said that it was simply because he liked repeating numbers, and when the price worked out at \$667 he changed it to \$666.66 because it was "easier to write".

## 9. Pippin

Apple made a games console, but it sucked. Called the Pippin, it was launched in 1995 for \$600. Only 100,000 were manufactured and reportedly fewer than half of those sold.

## 10. Apple's first logo

Apple's original logo starred Sir Isaac Newton. It was designed by Ronald Wayne and featured a detailed picture of Newton sitting beneath a tree with an Apple about to fall on his head.



8.

# What Apple could learn from Microsoft

If you are the best, learn from the rest. The seven things Apple can learn from Microsoft. Yes, Microsoft

**L**ook: you are reading *Macworld*, and we are huge Apple fans. And, yes, that means we aren't the least bit impressed with Microsoft. But when you are in a position of power, you should take stock and see what you can learn from rivals. Even rivals thrashing around like drowners (in hooded tops).

As Apple has become more successful, and Microsoft more weird, the Redmond guys have become more humble, creative, and collaborative. And that means – as odd as it could seem – there are some things Apple could learn from Microsoft. Here they are.

## 1. Embrace gaming

Not to say that Apple Macs or iOS devices aren't great for gaming, but that is because the hardware is second to none. If you enjoy playing games on your Apple computer it is despite Apple, not because of it.

Where Microsoft has a surprisingly good record of nurturing small games developers and facilitating innovation in the gaming world, Apple's closed off App Stores are a nightmare for developers big and small. The best games tend to be former Xbox and PC (and PlayStation) games, ported into Apple's world.

Gaming is important, to a wide range of end users, so Apple should follow Microsoft's lead and get with the gamers.

## 2. Get into the digital home

It also needs to sort out the Apple TV because, again, with the Xbox Microsoft is making Apple look bad. The Xbox is great: first it killed in the gaming world, then it extended into being a communications and home-entertainment device. The Xbox One is set-top box, movie theatre, video caller and – yes – games console. And Apple has the Apple TV.



**Gaming is important, to a wide range of end users, so Apple should follow Microsoft's lead and get with the gamers**

Controlling the living room is going to be a major battle in the coming months and years. And, oddly, Apple could also learn from Microsoft here.

## 3. Go cross platform

In an era in which loyalty to hardware products is at an all-time low, Apple continues to write great software to sell its excellent hardware, available only on its own hardware. It is clearly working well, but isn't it possible that Apple is in danger of missing a boat?

Apple has good software, and okay services, but only some of them are available on products other than Apple's own. In time this might start to hurt Apple.

It's great that we can use Windows on our Macs, but wouldn't it also be good to be able to use OS X apps on other devices? No? Just me? One of Microsoft's most profitable products is Office for Mac. And that's a lesson Apple could learn.

## 4. Rule the enterprise

Apple is making smart moves in this area, as it knows it has to. But keep an eye on Microsoft. Windows Phones don't need to be as good as iPhones to win the enterprise, they only need to be less terrible than BlackBerries.

## 5. Collaborate

Apple has been on top for so long that it can come over a little smug. Not even the best creative companies can be the best at everything. Microsoft is much more open. Almost always Apple is on the right side of this argument, and when it isn't it usually just buys up a rival. But sometimes, just sometimes, it wouldn't hurt to be a little more collaborative.

## 6. Try things. Try crazy things

We live in strange times. Apple makes sensible, iterative decisions that continue to shore up a lucrative consumer business. Microsoft shoots for the moon and makes bonkers products. Some of them work (Xbox One), most of them are awful (Windows 8).

In this scenario you would much rather be Apple, but post-Steve Jobs Apple must guard against complacency. It's more content to follow others success rather than start with a blank sheet. Apple will continue to kill Microsoft, but it wouldn't hurt to take some risks.

## 7. Apologise

Under Satya Nadella Microsoft has become humble. It admits defeat. It says sorry, when it is required to. When its products are bad, it acknowledges as much and says so.

This is rarely a good thing. Apple's sense of mission is one of its strongest points. But sometimes your strength can be your weakness. And just occasionally Apple could learn to say sorry.



# SMART HEATING SYSTEMS

The next big home technology will keep your home warm and save you money, as Matt Egan explains

**Y**ou've probably seen the adverts for Hive, with its quirky song about how great it is to control your heating from a laptop, smartphone or tablet. And yes, it is, but more than that, smart heating is likely to be a key part of every home going forward. As fuel costs rise and supplies run dry, the ability to heat our homes efficiently will stop being a nice bonus and become an essential part of every home's economics.

As part of the burgeoning 'internet of things', smart home heating systems are only the beginning of a process that will see us able to control power and fuel consumption. The aim of the game is efficiency: maximum comfort for minimal cost to you – and to the environment.

Over the past 12 months, smart thermostats and smart home heating systems have become widely available. If you have a boiler and central heating, you

will probably be able to fit any of the systems we review here, and the others we examine. Storage heaters are another matter, as we explain on page 53.

But not all smart home heating systems are equal, and which one works best for you is another question altogether.

The key question is how smart you need or want to make your heating. Most of these systems – Hive, Nest, NetAtmo, Honeywell and Tado – simply put a smart thermostat into the most used room in the house, and moderate the whole-house temperature to match. For smaller houses, where most rooms are in regular use, this is probably a cost-effective way of attaining the desired results.

Heat Genius and HeatMiser offer something more. They zone your house and then offer smart heating in each zone, so your guest bedroom is heated only when required, the master bedroom is warm in the morning and at bed time, and

the kitchen is hot at tea time. They are more sophisticated and objectively better solutions but they are more expensive. And in the UK at least, all modern houses with a total floor area greater than 150m<sup>2</sup> have to be built with at least two zones of heating, according to the Building Regulations. So again, a small, well-used, modern house or flat is unlikely to need this level of sophistication, while a well-used large home may have sufficient zones built-in to make Nest or Hive a good solution.

The right smart heating system for you will be dictated by your home, your use of that home and your need to save money.

The good news is that there is a way of making every house more efficient and comfortable and the householder more wealthy (or at least less poor). But the best way for each home will differ. Which is why this feature reviews the best smart heating systems currently available and offers an overview of the entire market.



## Tado Smart Thermostat

Price £250  
[tado.com/gb](http://tado.com/gb)



The Tado Smart Thermostat and remote-control app promises to save up to 30 percent on your heating and energy bills.

With US-based Nest not launching its smart learning thermostat in the UK until months later, its Germany-based rival Tado has got the jump on it. Tado is betting that its eponymous remote-control smart thermostat will take off in the UK in the same way that it has in its native Germany, where it is the market leader.

The company claims that its smart thermostat will help consumers save an average 27 percent in heating costs – about £180 a year for the average user. At a cost of £250 (self-install), the device should have paid for itself in 16 months. If



you get an engineer to install Tado, then the cost rises to £308, which would take 20 months to recoup, using Tado's figures. With the price of energy unlikely to fall in the next few years unless the government imposes price cuts on the power companies, reducing your electricity and

gas bills as soon as possible makes a great deal of sense.

While we can't confirm these quoted savings until we've run the Tado for a longer period, we can report that using this kind of system is a revelation in monitoring and controlling your domestic heating, and we're confident that savings are there to be made. The more control you have over your heating, then the more money you'll save; and with energy prices still sky-high right now, you'd be silly to ignore all solutions.

### Why buy a smart thermostat?

What would you say is the most expensive bit of tech kit in your house? HD TV? Super-slim laptop? Apple iMac? iPhone? Audio system? In most houses one of the priciest chunks of tech of all is the humble but money-burning boiler. A new, energy-efficient boiler will probably set you back anything between £1,200 and £2,500



including installation – that's more than most smart TVs or laptops.

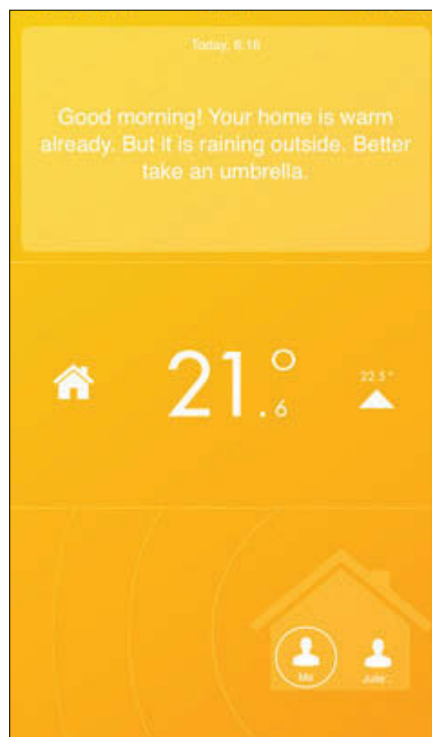
Yet the real cost of a boiler is much higher than the purchase price, as an inefficient model will be costing you hundreds of pounds a year in wasted energy. One option, especially if your boiler is over 15 years old, is to replace it with a new energy-efficient model. The average saving when replacing a G-rated boiler is £225 a year. If your existing boiler has a more efficient D rating, you can still expect to save as much as £65 a year by replacing it. Even given the cost of a new combi boiler purchase and installation, you'll be saving money in the long run, with the energy savings covering your initial outlay quite possibly within five to seven years.

Based on a saving of 25 percent gas usage, the Energy Saving Trust estimates the average household saving on energy bills after installing a new boiler is £310. And if your current heating system doesn't include a room thermostat, the potential savings in using a smart system such as Tado are greater.

If your boiler isn't that old and is still going strong, a cheaper way to make your boiler more efficient is to get smarter. There is a growing list of smart thermostats and systems appearing on the market, all of which promise to slash your heating bills.

The best known after Tado is Nest, from the ex-Apple guys who originally worked on the iPod. It looks gorgeous, and is simple to use. Google liked it so much it forked out \$3.2bn to buy the company. Since October 2011, Nest claims its US customers have saved more than 1.4 billion kilowatt hours – enough electricity to power more than 135,000 homes for a year. Nest made its UK debut in April 2014.

The US Environmental Protection Agency says that customers could reduce their energy usage by between 10 and 30 percent by using the schedules and temperature settings of programmable (semi-smart) thermostats. These let you programme temperatures for certain times of the day, so you can automatically lower the temperature when you'll be out of the house, for example.

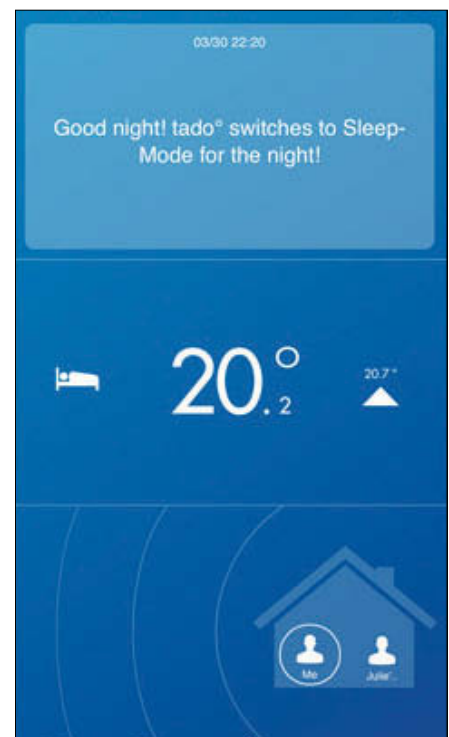


Unfortunately up till recently these programmable thermostats have been tricky for the average homeowner to operate correctly. The new, smart remote-control thermostats, such as Nest and Tado, connect to home Wi-Fi networks and come with simple smartphone apps.

What differentiates Tado from Nest is its smarter learning features. Nest programmes itself by learning your behaviour patterns and the temperatures you prefer for certain days and times – which it calls 'Nest Sense'. It then builds a schedule for your heating system to follow. You control Nest through the outer-ring dial (see page 46) to adjust temperatures or via the mobile app.

However, the brains at Tado believe that the smartphone will become the remote control for everything inside the home. In this way Tado is more revolutionary than Nest. With Tado there's no physical dial that lets you adjust your home's temperature, and, at first, that feels weird. Everything is controlled via your smartphone app (iPhone and Android) or the desktop web app. It creates a more real-time and less static schedule than the Nest approach.

You set Tado a target temperature for the room you and your family spend most time in, which is where you place the Tado



Temperature Sensor. Tado is powered by a solar cell, which the company claims will never run out of power.

As there's only one sensor – Tado may add more in the future to add zoning – Tado is probably best suited to smaller homes (one to four bedrooms).

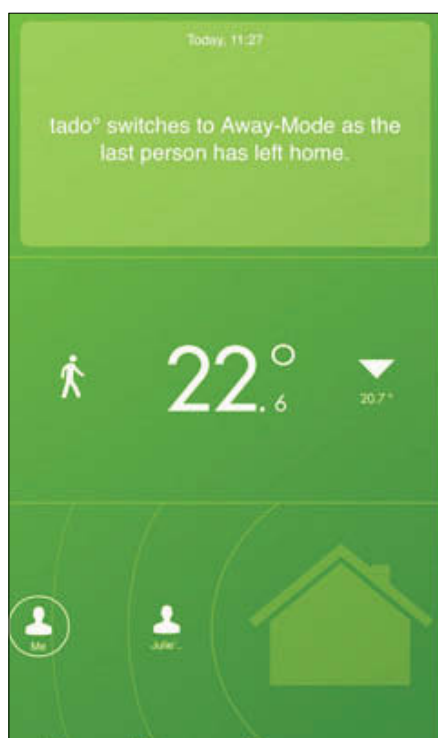
You also set the usual times you wake up at in the morning and go to bed at night; you can enter different times for weekends. Tado then knows to heat up the house ready for when you bound (or crawl) out of bed in the morning. If you think the heating comes on too soon, it's easy to adjust Tado's settings via the apps.

Tado sets a minimum sleep temperature of 15°C, as it argues that letting the temperature drop lower would force the boiler to work harder in the morning. There's also a maximum of 25°C, so if you like your house really hot, Tado might not be for you.

All this smartness takes a bit of getting used to. In the UK we generally set our boilers to come on and off using timers. Creatures of habit, we get up at the same times on weekdays and mostly regularly on weekends too. If we get cold we walk to the boiler and turn up the temperature.

With Tado you leave the heating on all the time and the smart thermostat does all the thinking for you. It even knows





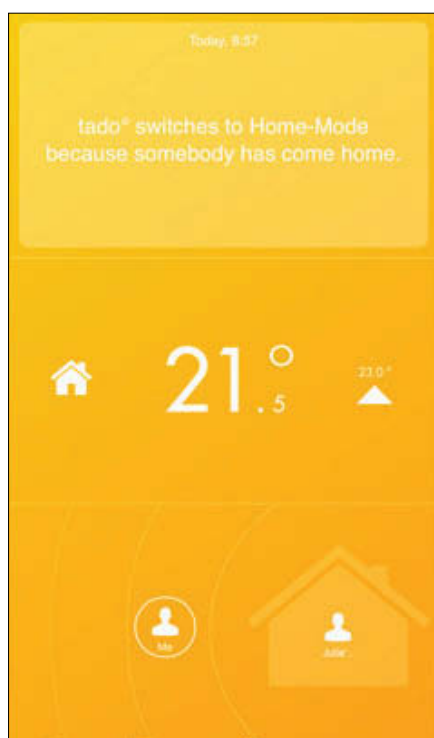
whether you are at home or elsewhere, so if you do break out of your routine – either staying at home for the day when you'd usually be out, or being away when you'd normally be in – Tado will turn the heating up or down depending on your location.

Nest on the other hand creates an auto-away mode based on what it's learned, but doesn't actually know who is in the house. Using sensors and algorithms, it makes a guess as to when people are in or out to prevent heating or cooling an empty home. When it senses you're back, the Nest thermostat returns to the regular schedule.

Via the GPS in your smartphone, Tado uses presence detection to know whether you're at home or away. Indeed, it controls the heating depending on how far away from it you are, and starts heating up the house as you get nearer.

If you pop to the shops for an hour it will gently lower the temperature to save money but raise it again as you head home. If you're out all day on a trip, Tado will lower the heating further and for longer, but knows when to raise it again when you're on your way back.

Depending on how far the residents are away from home, Tado lowers the temperature. As soon as one resident gets near, Tado heats the home up.



If you have a guest or a babysitter who remains in the house while you're away, you can switch Tado to manual mode. If you want to, you can set a temperature manually at any time.

But would all residents who might stay in the house unaccompanied have a smartphone to use the app? Well, they probably would, as most children who are old enough not to need a babysitter have smartphones these days.

Tado is compatible with iOS (iPhone and iPad) and Android. BlackBerry is expected soon, and an app was released a few weeks ago. With the free Tado app installed on all residents' phones, Tado can run your heating to an optimum level.

Another smart thermostat is Hive, available for £199 to customers of British Gas only. Like Nest, Hive doesn't offer presence detection, and is a little less smart than Nest as you have to adjust room temperature as you leave the house.

Tado expects in the future to enhance the system software with an expert mode for even finer user controls. Until then you can contact the company if, for example, you wanted to extend or reduce the area of presence detection.

Tado is a clever little thing. It learns about the performance of your heating and how it works together with your

house or flat. The company claims that Tado should be operating at maximum efficiency within three weeks. It examines your daily temperature data to work out how fast (or slow) your house warms up, for instance.

In the first few days the smart thermostat might behave a little erratically as it tests and gets to know your heating system and your home.

Tado also uses a range of local weather data to know when to raise or lower the heating to your desired level of comfort, as solar radiation affects room temperature.

The app is clear and simple but full of information. The background colour changes depending on the mode it is operating in. Orange denotes home mode – for when a resident is home. Green is away mode – after the last person has left the house. And blue is sleep mode – when your sleep time begins.

There is also a Tado web app you can access with a web browser on a PC, Mac or laptop. The web app gives an overview of all Tado's activities: a detailed report with a temperature curve, heating activity and events that influence the temperature regulation. You can also adjust all settings, set a schedule for residents without a smartphone, and manage your account.

So what happens if you leave your smartphone at work and nobody else is home? There's a button on the Tado box that lets you or an unattended guest tell Tado that someone is actually home. This mode is deactivated by pressing the button again, or in the web app you can tell Tado to go back to the programmed heating schedule.

If you turn off your heating in the settings, then it will stay completely turned off except for warm water. But because Tado tracks the room temperature it will nevertheless turn on the heating once the temperature falls below 5°C – a great fall-back safety feature to prevent frost damage to the property.

Pet owners who leave their animal unattended for most of the day will want to consider the best temperature for their pet. A dog doesn't need a room temperature of 23°C. And Tado doesn't let your home cool down completely when nobody is at home. **Simon Jary**

## Hive Active Heating

Price £199

britishgas.co.uk



Smart thermostats are like buses and, well, you know the rest. For the best part of 30 years there were no technological advances in thermostats and now – boom! – everyone wants to sell you an internet-connected box that lets you control your heating from anywhere. You've probably heard of Nest (now owned by Google) but maybe not some of the others such as Tado, HeatMiser and HeatGenius.

These systems all do pretty much the same thing: they let you use your portable devices, such as tablets and smartphones, as well as PCs, to control and monitor the heating system and hot water in your home. The main advantage, of course, is that you can turn the heating on or off – or adjust the temperature – when you're not at home to do it yourself.

British Gas has also decided to get in on the action with Hive, but it's important to note that you don't have to be a British Gas customer to have Hive.

The system will cost you £199, which includes professional installation. Or you can opt for the Hive kit at £159 and install it yourself. At the time of writing, you can get a free Hive system when you sign up to a 18-month contract with British Gas.

The Hive system works with most boilers, but you can check on the Hive website if yours is compatible.

### Installation

Assuming you decide to go for the installation option, you'll have to make an appointment for an engineer to install Hive at your property.

The friendly British Gas engineer arrived on time for our install, which took about an hour and a half. There's a hub which is connected to connected to a spare port on your broadband router (and also needs mains power), a receiver which connects to your boiler, and a wireless thermostat which should be placed in the room which you use the most.

The engineer also showed us how to set up the app on our iPhone to check that everything was working as it should.



### INSTALLABLE-ANYWHERE THERMOSTAT

Even without reading the manual, the system is easy to understand and use.

The thermostat doubles as a controller unit and runs on batteries, so can be installed on any wall. Unlike other systems, such as Nest, the Hive thermostat needs to be installed permanently in one place.

There are guidelines on where it can be positioned, but the engineer will recommend a location which is best for your heating system. In our case, it simply replaced the old thermostat in the hall.

The last step is to create a Hive account at [hivehome.co.uk](http://hivehome.co.uk). You can use only the thermostat to control everything, but this rather defeats the whole purpose of upgrading. As well as being able to control your heating from the app, you'll get live energy usage information.

Currently there are apps for iOS and Android, and a Windows Phone 8 app is in the works. Once you've entered your account details into the app, along with the hub ID, you're ready to start.



## Features

The apps are designed well, being both clear and intuitive to use. While you can use the app on a tablet, it's clearly designed for a smartphone's smaller screen. We actually preferred the look of the web app over the mobile version, since it has clearer navigation and it's easier to set up the schedule.

In the app, the heating section has three main controls: schedule, manual and off. The hot water control also adds a boost feature, which could be handy if you're heading home early and want to make sure there's enough hot water for a bath. Big numbers tell you the current temperature and what temperature the heating is set to. You can adjust the set temperature by simply swiping up or down on the screen at any time.

When it's in the off position, the system automatically goes into a frost protection mode. If the temperature inside dips below 5°C, the heating will turn on to prevent pipes from freezing.

The schedule section has a seven-day, 24-hour schedule preset, but you can easily tweak this to suit your lifestyle. This is quite fun to do with the web app's large, colourful and easy to understand controls.

Apart from controlling your heating and hot water temperature and setting up a schedule, there are many other options.

You can manage your Hive devices. The app will show you whether the hub, receiver and thermostat are connected to each other, their signal strength and their power or battery status. You can also set up notification, which will alert you when the temperature reaches a specified level.

Finally, Hive lets you add a PIN lock to prevent others – kids, for example – who share your smartphone from changing the Hive settings you have chosen.



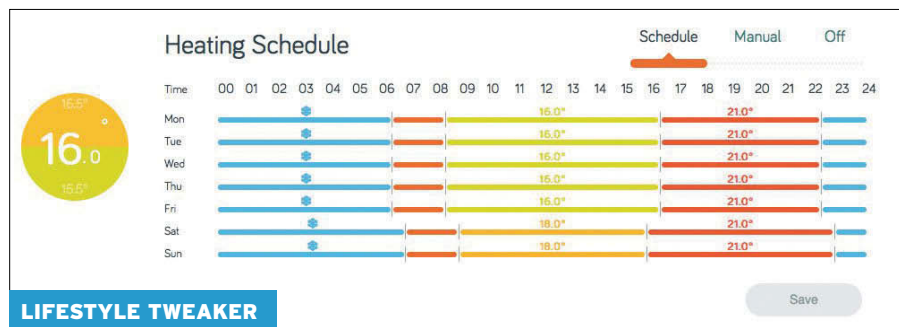
If you don't have a smartphone, or it isn't an iPhone or Android, then you can enable text control, which allows the system to be controlled by sending a text.

A new addition to the Hive mobile app is geolocation. With this enabled, your smartphone will automatically notify you of your specific away and home temperature settings, or if the heating is on or off, when you leave your home or as you come back.

## Macworld's buying advice

The Hive Active Heating system is a great upgrade for anyone who wants or needs the ability to be able to control their heating remotely. It's by no means the most advanced or best-looking smart thermostat, but it will do the job for a lot of people. However, it doesn't offer zoning control over individual radiators (yet), and isn't much cheaper than rivals, some of which offer more.

It's still early days for smart thermostats and we haven't had the system long enough to test the claims that they can save you £150 a year (and it's virtually impossible to prove – or disprove – that anyway), but the main advantages of Hive are ease of use, remote control and those great colourful graphs and charts that make you feel like you're in control of the energy you use. And let's be honest, just about everyone loves a nice-looking graph. **Dominik Tomaszewski**





## Nest Learning Thermostat

Price £179

nest.com/uk



Smart thermostats are hot right now, with gas suppliers starting to get in on the act and bundle them with some of the tariffs they use to woo prospective customers. nPower is offering free Nest thermostats to customers signing up for its Intelligent Control tariff.

Nest stands out because of its circular colour LCD display, which makes it a gadget you'll want to show off rather than hide away. Because it has a display, you don't need to launch a smartphone app to change the temperature, yet the kit is no more expensive than others that come without a screen.

The stand was developed especially for the UK, but it's not included in the box and will cost you an extra £29. However, while the stand might be useful in some cases, most people should be able to use their existing in-wall thermostat wiring to power Nest's screen. The kit even includes a big plastic plate to cover up the old wallpaper, paint or holes you'll probably be left with when your installer removes your old thermostat. That's because Nest is much smaller than you might expect, at just 83mm wide.

The display itself has a 44mm diameter and a resolution of 320x320 pixels, the same as the latest Android Wear smartwatches. Viewing angles are good left to right, but not when viewed from below. So if your old thermostat was mounted quite high up on the wall, contrast may not be all it could be.

The rotating dial surrounding the display oozes quality. It doesn't click: any sound you hear is coming from the speaker inside the device. The whole unit can be pushed to select options (and enter the menu), but all settings can also be accessed from the free app, which is available for iOS and Android. There's no official Windows Phone app yet, but you can also check and adjust settings from the Nest website, where you can view energy reports too.

A hidden sensor under the display detects movement and automatically turns



the screen on when you walk past or raise your hand to use the dial. Another sensor detects if the sun is shining on the display and ensures it doesn't play havoc with the internal thermometer, which would otherwise signal that it's time to turn off the boiler.

### Heat Link

The other gadget in the box is the Heat Link. This attaches to your boiler, and has built-in Wi-Fi to connect the system to the internet via your wireless router. Virtually every other smart thermostat has a third component that connects to an Ethernet port on your router, so this is a much neater solution if your Wi-Fi coverage is good enough. The Heat Link has a button you can press to put Nest into manual mode, just in case you need it. Holding it down for 10 seconds resets everything.

Nest recommends you have the system professionally installed because of the high voltages involved. However, if you're comfortable changing a light switch, you should have no problems installing it.

The Heat Link is compatible with the vast majority of heating systems, including combi boilers, those with hot water tanks, underfloor systems, air-source and ground-source heat pumps and others. You can check Nest's website to see if your system is compatible.

### How it works

At its most basic level, you can use Nest just like a thermostat. You can walk up to it, turn up the heat and sit down again. If it's too hot, you can turn it down a bit.

It's a lot smarter than this, though, and you'll probably find you won't need to touch the dial (or app) much once the system has learned your schedule. This is

partly done through training: for the first week or two after installation, you're encouraged to turn the dial down when you leave the house, and turn it up when you come back in.

Nest's movement sensor also detects whether anyone is still at home. If not, it will turn down the heat, and show auto-away on the display. Pets won't set off the sensor, so you won't end up wasting gas by heating the house up for the cat.

It should go without saying, but we will anyway, that you can control the temperature from anywhere using the app. As long as you have an internet connection, you can change settings and turn down the heat remotely.

The thermostat is also a programmer, so you can use the display or app to set a schedule, just as with a traditional programmer. However, instead of using 'on' and 'off', you set the temperature you want your home to be when you're in, and a low temperature for all other times – Nest calls this the setback temperature.

Thanks to the learning process, the Nest will automatically create a schedule for you, and you can see in the app whether changes in temperature were due to someone manually operating the dial or automatically triggered by Nest based on schedule.

In the couple of months we were testing Nest, the auto-schedule produced some very odd timings. However, because the testing period was summer and no heating was needed, it is impossible to come to any conclusions about this. Nor is it possible to say anything about the effectiveness of the system, including the much vaunted True Radiant feature, until we have comprehensively tested it with the heating on. True Radiant, incidentally, is Nest jargon for learning how long it takes your home to heat up so that it can fire up the boiler at the right time to hit your scheduled temperature.

You can check on the status of Nest's learning feature by going to the settings in the app or on the website, where each feature will either say 'Ready' or 'Learning'. You can also disable any you don't want, apart from Leaf and Time-To-Temp.

The Leaf appears on the display when you set the dial to an 'energy-saving

temperature', encouraging you to keep the heat below 19 degrees or so.

## Zones

Some rival smart thermostats allow you to control the temperature in different 'zones' around the house. Nest can do this too, but you will need a separate Nest thermostat for each zone for this, which is not a cost-effective option.

With a single Nest thermostat, you're reliant on any existing 'dumb' TRVs to shut off radiators when the set temperature is reached. For most normal-sized homes this works well enough, and means you're still saving money compared with the £50 or so you'd spend on each smart TRV for a system such as HeatGenius. If your home has 10 radiators, it will take quite a few years before you start saving any money due to the high initial outlay.

Also bear in mind that you can only use multiple Nest thermostats in a home which has a heating system that can heat different zones individually. Older homes with a conventional gas boiler typically heat the entire house, and unless the pipework is physically changed to include two or more valves for different zones (upstairs and downstairs, for example), then adding extra thermostats is pointless.

## Nest Protect

As well as controlling heating, the Nest system integrates with the Nest Protect smoke and carbon monoxide detectors. These are available in mains and battery-powered versions, each costing £89.

However, these detectors are much smarter than traditional alarms as they use vocal warnings instead of meaningless beeps. For example, if you have multiple Nest Protects installed, you might hear the warning, "Be aware: there's smoke in the living room," giving you a heads-up on a potential problem.

The integration also means you'll get a notification on your smartphone or tablet to warn you of low battery power, or when an alarm has gone off – which can be useful if you're away from home.

## Software version 4.3 update

Since Nest was launched in the UK, there have been a couple of minor software

## THE NEST PROTECT DETECTOR



updates, although a much bigger update was being rolled out as we went to press.

The major update includes three new features: enhanced auto-schedule, quick view and system test.

Nest has refined the algorithm for determining an automatic schedule, and claims it could deliver extra savings up to 6 percent. This third version of the algorithm has a better understanding of how long your home takes to heat up, and slightly reduces the time until the system switches to auto-away. The enhanced auto-schedule 'learns all the time and reacts quicker to changes in routine' such as school holidays.

The second feature – quick view – is much more noticeable since it's a new interface for the settings on the thermostat itself. While the main temperature screen remains unchanged, the new view gives you a lot more information at a glance and means you don't have to go into submenus to see information such as yesterday's energy use or the next item on the heating schedule since the text in the centre changes as you rotate the dial.

Finally, the system test feature has been added to solve two issues. First, the installer can test the system and ensure it's working properly before leaving. Secondly, it lets you test the efficiency of your heating system to make sure it's working properly before winter sets in, and hopefully get a heads-up on any potential issues. It works by timing how long it takes to reach a set temperature,

and warns if that is too long based on how long it has taken previously.

There are a couple of other minor updates, such as the addition of more time zones and weather information for eastern Europe and Asia. More relevant for UK users is that error messages will now appear in the iOS and Android app instead of only on the thermostat's display.

## Macworld's buying advice

Nest is the only smart thermostat system which also incorporates a smart smoke detector. Does that make it the best choice for you? It's certainly easy to use and the display is a great talking point.

The smoke alarms are on the expensive side, though, especially if you need two or three to cover your whole house adequately. Yet the Nest kit itself is good value at £179, and should pay for itself within a couple of years.

Saving money, though, is only one benefit of smart thermostats: the ability to monitor and control your heating remotely is also very useful. The only way you'll get a cheaper smart thermostat is by getting one bundled with a new gas tariff, so on that basis Nest is good value.

One last thing to bear in mind is that you could buy a system that allows you to control multiple zones cheaply. You could start off with the basic thermostat, and add controllers for other zones later on, but for those who are happy to have just one thermostat and rely on TRVs to control each radiator, Nest is a fine choice. **Jim Martin**

## Heat Genius

Price £799 inc VAT

heatgenius.co.uk



Heat Genius is a remote heating control system for your home that is smart and wireless. Unlike the smart thermostat systems reviewed here, it defines zones in your home, and then lets you control the temperature of each via laptop, smartphone or tablet apps. It measures occupancy and temperature, and should reduce heating costs over time as you heat only the parts of the house that need to be warm and only when they need to be warm.

Physically, the Heat Genius system consists of a central wireless hub that communicates with smart TRVs to switch your radiators on and off, as well as wall-mounted movement sensors, and smart plugs as required for connectivity. The hub communicates wirelessly with the other composite parts of the system, and is controlled via an app or web interface. Once the hub is hooked up to the broadband network in your home, you can even access the heating system from anywhere that you can get online, too.

### Installation

When you first enquire about purchasing Heat Genius, the company surveys your needs in detail. Before anything is installed, Heat Genius discovers exactly what you, your family and your home requires – and, indeed, whether a smart heating system such as Heat Genius is an appropriate choice.

Suffice to say that if you have a boiler and a thermostat, then the system will work in your home. But as we discuss below, not all homes will benefit from a system as sophisticated as this one.

The physical installation is handled by a plumber local to you, trained and subcontracted by Heat Genius. They turn up at an agreed time on an agreed date with a detailed plan of what is required in your home. They don't leave until an extensive checklist of tests has been carried out.

By the time the fitter leaves you will have a working smart heating system, and



you will have been instructed in its use. You also have a manual override switch on the boiler itself, so that if for some reason the system fails or you can't work it, you can switch the heating and the hot water on and off as before.

Again, with a commitment as big as changing the way your home heating works, this is a critical feature. You don't want to be without the means of controlling your heating as winter rolls in.

### Using Heat Genius

I've been using a Heat Genius system in my 1950s semi-detached, brick-built home for several months now, as the external temperature has dropped. We have an elderly boiler for both the central heating and the hot water, and radiators in all the rooms. Our Heat Genius installer divided our home into zones: kitchen, bedroom, landing, front room and spare bedroom. Each of these zones has at least one radiator, now controlled by smart TRVs (the control on the end of a radiator that lets you set the level of heat).

This zoning setup does exclude some other rooms with radiators, such as the bathroom, nursery, conservatory and various hallways. Our installer grouped those into a virtual zone called 'whole house'. So now, even though we cannot exactly control the temperature in those rooms, we can remotely switch on the heating in all those places. So we are no worse off than before, even in the spaces that aren't zoned.

It's also worth pointing out it would be easy to define the additional rooms as zones, simply by buying and installing the extra TRVs, and adding them to the system. A simple job. As is moving a

zone from one room to another, and renaming it. For example, zoning the guest bedroom probably wasn't all that important on reflection.

Using Heat Genius is simple. You get a guide book, which is useful but not really required. We now heat the bedroom and landing for only an hour or so every morning in time for the household waking up – early during the working week and a little later at the weekend.

The kitchen is heated for the time we return home from work to cook and eat. We set this on a timer via the app, by tapping the rooms and the time of day we wanted to be heated, and the desired temperature for those times.

One early learning curve was that we initially set the warm period in our bedroom for before our usual waking time and just before we get home in the evening, presuming that the system would need to come on early to heat things up. But that is how dumb heating works, and Heat Genius is smart. Very smart.

It measures the ambient temperature in the room and puts the heating on only for as long as it needs to maintain the correct temperature throughout the correct time. This also makes the Heat Genius system an all-year-round set-and-forget product: no more spousal arguments about putting on the heating in September. You just tell Heat Genius what temperature you want a zone to be and it will do the rest. And, as with the manual override switch on the boiler, you can always use the app to override and switch on any of the zones. So perhaps those spousal arguments are fated to continue regardless. Such is life.

The timer is just the simplest way of utilising Heat Genius. It's a good start for



saving fuel and money, as we are now using only one or two radiators where previously we were using all the heating in the house. But there's more. Over time Heat Genius uses its chest-high in-room sensors to build up a picture of your household's room occupancy. It also plugs in to local weather information to find out the external ambient temperature.

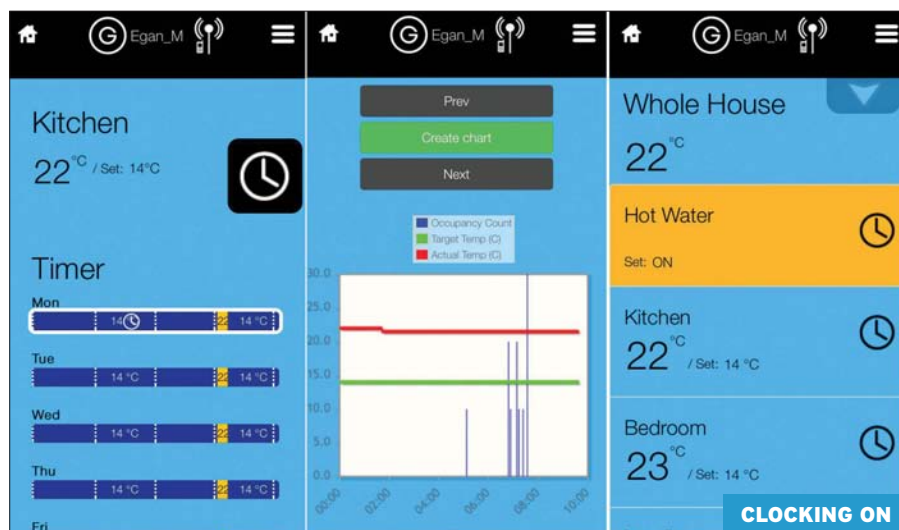
You can therefore enable the eco mode for each zone or the whole house, simply set a desired temperature for when the rooms are in use, and then let Heat Genius do all the rest. This is the smartest way to use the system, and the most aggressive way to save money. And any time you aren't home, you can switch off the heating from your smartphone.

Modes include super eco, eco and comfort, ranging from maximum money saving through to maximum comfort. Reader, I am a Yorkshireman; which do you think I prefer?

The other aspect of the Heat Genius setup is the smartplugs. These can seem incidental, but because the Heat Genius communicates through line of sight and the signal bounces of each device on the system, they do help communication. You can control the smartplugs in much the same way as you control the heating within zones. So you could, say, set lights to come on and go off at specific times via the timer or manually from the app. You could switch off the fridge for an hour or two each day, for instance, and save money during peak times. Or you could set your coffee machine to go off five minutes before you rise in the morning.

## What is great

I'm really impressed with Heat Genius. Most important is the value of zoning and flexibility. Once you have set the system up, it is easy to use and adjust, and it allows you to heat only the rooms you need to heat, when you need to heat them. Because it is entirely wireless it is very simple to add zones to the system or move them around, and this level of flexibility didn't require a high-impact installation process. Heat Genius is both flexible and scalable. It's worth pointing out that Heat Genius offers constant support post-install too.



Heat Genius lets you do a lot with a relatively small amount of hardware. Between the various eco modes, the timer, overrides and even the smart plugs this system is a true smart home system. It just needs to draw the curtains and put out the bins to have the full 'Tomorrow's World' feel.

The app interface itself may not be the most beautiful, but it is very simple and easy to use. Hidden away in the settings section are the advance settings, which allow for more complex troubleshooting and so on. But, honestly, since the system has been set up we haven't had cause to look in there. My wife just started using the app and the system without a glance at the instruction guide book – that's as it should be, but also good to know.

We like the fact that Heat Genius detects when you open a window, and turns the heating off in response (you can override this). And it is fascinating to view charts of how you use your home and the heating. The truly cost-conscious (hello!) can spot inefficiencies and save money by addressing them. And although we haven't yet been able to test this, Heat Genius can use weather forecasts to predict frosts, and keep your pipes warm to avoid bursts.

Finally, we have been impressed with the level of security baked into Heat Genius. This is important because data about your home usage in the wrong hands could leave you vulnerable to burglary. Your account is password-protected, the data encrypted.

Most important of all, Heat Genius itself doesn't see that aspect of your app use. It can access the advanced settings page of your account to troubleshoot problems remotely, but it doesn't see how hot you like it in the bedroom (so to speak). When you consider that some rival products such as Google's Nest exist principally to build up user data, this is a refreshing approach. And it means that you aren't relying on Heat Genius to keep your crucial data safe.

## What isn't so great

The benefits of a wireless system are great in terms of flexibility and low-impact install. But we did have some connectivity issues when the system was first set up. My house is particularly poor for wireless, being full of thick brick walls and small rooms. Heat Genius got past this but it required the installation of two powerline adaptors, and the hub now lives in the kitchen – closer to the boiler than where the router sits just inside the house. This isn't a massive criticism of Heat Genius, it is an issue with wireless connectivity. And the system works fine now. But it does mean we have another set-top box type device in the kitchen, as well as powerline adaptors dotted around the house. It would be much neater to site the hub under the TV with the router.

We also have very occasional ongoing issues with connectivity. Sometimes, for no apparent reason, the app will indicate that a couple of rooms have lost contact with the hub. To date, this has always

resolved itself in very little time, with no intervention required on our part. And it is only fair to point out that when a room isn't connected its radiators act in the same way as the 'whole house' radiators, so they would still come on when any room was set to heat. So the worst outcome is too much heat, which was no more than what was happening every day before we had Heat Genius fitted. But it is a little unnerving.

One other minor oddity is that Heat Genius fits a smart-looking thermostat with an LED display, but this is redundant within the system as it stands. Indeed, if you have guests staying who don't have access to your app, then they have no means of adjusting the temperature beyond using the manual on/off override. What they do have is a visual thermostat that only looks like it might work. Heat Genius told us to expect this feature to be enabled sooner rather than later.

Other than that? Nothing, really. Heat Genius is a system that does a useful thing well. If we were nit-picking we'd say that the app interface is not the best-looking and occasionally it requires a couple of hard presses on the home icon to get to the home screen. Oh, and the smart TRVs make a very quiet noise when they connect and make changes.

The only possible barrier to you rushing out to buy Heat Genius today is the old issue of price and value. And this is not entirely clear-cut. Whether it represents value for you really will depend on how sophisticated your needs are.

### What it costs and value

Let's be clear: Heat Genius is not the cheapest solution you can buy. The best-known smart home heating systems around are Google's Nest and the Tado and Hive systems. Each of these costs less than £300 installed and up and running). The Heat Genius system in my home would cost £799 to buy (installation is currently free, although that is not always the case). The Genius hub itself costs £249 and the hot water controller is £49. Four zonal sensors will cost £34 and the smart valves for the radiators are £59. You get the smartplugs thrown in, but you can see how the price racks up. But that is

not to say that Heat Genius is poor value. Far from it. It's just not cheap.

The critical issue here is the zoning. Where Nest, Hive and Tado put a smart thermostat in one room of the house, and switch all the heating in the house on and off based on the temperature in that room, Heat Genius does something similar for every room. You could replicate the Nest, Hive and Tado experience for the cost of the Genius hub, one sensor and one valve – £345. But that would be overkill if the less sophisticated features of Nest, Hive or Tado would work best for you.

The nearest product to Heat Genius on the market right now is HeatMiser Neo (see right), which offers similar functionality and features, but is a wired rather than a wireless device.

Heat Genius told us that it believes its system could pay for itself in two to three years. That seems feasible in some circumstances, but not all. Consider Heat Genius if, for instance, you have a large house in which some rooms are used only rarely. Especially if it is an older house that is hard to heat, and you spend a lot of time at home but take regular trips away. Heat Genius would be ideal for a retired couple once the kids have flown the coop, for instance – perfect for when the family comes visiting.

But if you live in a small house or flat, where all the rooms are occupied and everyone is out all day, in my view it would take considerably longer for the investment in Heat Genius to pay for itself. If that sounds like you, the smaller investment in Tado, Hive or Nest may be more appropriate (if less cool).

### Macworld's buying advice

Heat Genius is very good at a very useful thing. It is easy to use and efficient, and over time it will save you the cost of installation. And it is fairly priced. How long Heat Genius takes to pay for itself will depend on your circumstances, and it may be that dropping £799 is too much of a long-term investment for you. But it is a great product, and if you are looking to install a zoned smart heating system in your home, we are happy to recommend Heat Genius. **Matt Egan**

## The smart thermostats we didn't test

### HeatMiser Neo

Price £203

[heatmiser.co.uk](http://heatmiser.co.uk)

HeatMiser must be the closest thing to Heat Genius on the market right now. It's a fully zoned heating system that gives you smart control over the heating for each room in your house. Like the Honeywell Lyric (see below), it comes with a geofencing feature that allows you to set the house to automatically heat up as you get near it. Alternatively, as with Heat Genius, you can set up each room on a timer, or measure the usage of the house and heat rooms only when they are in use.



With Neo you get air and floor sensing, and flexible programming similar to Heat Genius. You can set comfort levels for day and night, and easily switch off your heating, remotely. It requires a DHCP-compatible broadband router, and you'll need an iOS or Android-compatible mobile device. The basic kit costs just £203, but realistically you may need someone to fit it for you. And that kit contains only one zone, so to get a Heat Genius-style setup you need to pay out a Heat Genius-style amount.

### Honeywell Lyric

Price from £150

[lyric.honeywell.com](http://lyric.honeywell.com)

There are multiple Honeywell smart thermostats on the market, the most



recent being the Lyric, which is similar to the much trailed Nest, reviewed earlier. It connects via your home Wi-Fi network, and in principle at least is simple enough for you to set up at home. The Lyric looks the part of a smart home device, with its 3in-diameter polished glass face and a nice-looking touchscreen interface.

You can, as you would expect, control your Lyric thermostat from anywhere with your smartphone or tablet. A geofencing feature automatically regulates the temperature when you're away from home, measuring that distance using the GPS chip in your phone. Honeywell makes great play of a fine tune feature that considers both temperature and humidity – which may not be as useful in the UK as in, say, the US.

At first blush then, we'd say that the Honeywell Lyric looks like a fully featured smart thermostat. It costs between £150 and £199 from various UK retailers.

## NetAtmo Smart Thermostat

Price £147

[netatmo.com](http://netatmo.com)

At the simpler end of the smart heating system scale, there's NetAtmo Smart

Thermostat. The company says the system is simple enough to install, and that anyone who has ever changed a light fitting should have no problem installing NetAtmo.

The thermostat itself is a cute little white box with an LCD display. You can either attach it to the wall or use it wirelessly throughout the house. This sounds remarkably convenient for anyone with a smaller house or flat who doesn't want to go to the trouble of zoning.

NetAtmo will still heat the whole house according to the temperature on the thermostat, but at least it will mean that the temperature is right for the room you are in. You can adjust the temperature directly on the thermostat or remotely from your smartphone, tablet or PC.

And that's it really. NetAtmo Thermostat will create a programme to reflect your habits, but it is based only on your habits and the temperature outside. It's about as simple a smart thermostat as you can buy, but none the worse for that if simple is what you need. At €187 (£147 including tax and delivery) it is reasonably cheap to buy direct.



## Inspire Home Automation Room Thermostat

Price £124

[inspirehomeautomation.co.uk](http://inspirehomeautomation.co.uk)

From Inspire Home Automation comes this internet-controlled programmable room thermostat. It costs £124 and can be installed – or so Inspire tells us – by anyone. Once it's in, it gives you remote



access to your existing heating controls and the ability to monitor the central heating system from anywhere with an internet connection. There is an app for iOS and Android devices, but you can also control it from the web. This is a cheap if basic solution that on the face of it will be a simple answer for smaller homes.

## PassivLiving Heat

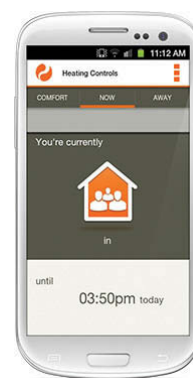
Price £279

[passivsystems.com](http://passivsystems.com)

Equally simple but effective is PassivLiving Heat. For £279 (plus an optional service fee of £3 per month that kicks in after a year), PassivLiving simply installs a smart controller for the boiler that you control via the smartphone app or online interface.

PassivLiving Heat is relatively basic and lacks zoning. You can set your boiler to one of four states: in, out, asleep and away. And you can define what these modes mean to make your home the temperature you want, when you want it. The system measures the inside and outside temperature, and adjusts the system if the external temperature changes.

PassivLiving Heat is compatible with the majority of boilers available in the UK.





# What happens to smart heating when the internet is broken, there's a power outage, or the batteries run out?

Matt Egan looks at the consequences for your smart heating system if the Wi-Fi or power goes off



Smart heating is great, and coming soon to a house near you. The ability to control the temperature of your home from laptop, smartphone or tablet is both a cool function, and a great money-saving device. Heating only where you need when you need it is going to become a big deal in the next few years. Not least because it suits the energy companies to conserve fuel.

This is all great when it works. But just as you can't tune a digital TV if the signal is slightly out, so smart home functionality is an all-or-nothing proposition. Recently the broadband stopped working in my home and, as well as the usual panic over lack of communications and entertainment, it meant that the heating stopped working.

In fact, it very quickly became apparent that the lack of Wi-Fi didn't have to mean a lack of heat at all, but it pays to know what will happen in the eventuality of a power cut, the internet going down or the batteries running out.

Heating, after all, isn't an optional extra that can be casually discarded when the power goes out. So here is what we learnt about what happens to smart heating when the lights go out.

## What happens to smart heating when there's a power cut?

If the power goes out, then you lose your smart heating system's smartness but the dumb heating keeps working. Or to be precise, the heating will still work as it has always worked after a power cut. But what that means is that in most cases you will not be able to use the heating after a power cut. Only very old heating systems can operate without any power at all.

This is a shame, because in almost all cases the smart controller has to have a

battery backup so the smart element of your heating should continue to work just fine. You won't be able to control the heating remotely, or set a new heat regime, but if by some miracle your central heating doesn't require current to operate, you will be able to flick the heat on or off. Like you used to have to.

In all probability, though, you are going to be cold – but that's because of your heating system rather than your smart heating system.

## What happens to smart heating when the batteries run out?

Again, in almost all cases smart heating systems don't rely on batteries. The batteries in smart thermostats such as those of Nest and Hive exist only as backups and should never be required unless the power goes out. As a consequence they should never need to be replaced. But if they do, the thermostat will tell you in good time that a replacement is needed.

The exception here is HeatMiser Neo and Heat Genius, both of which are zoned smart heating tools that use smart TRVs to operate each radiator separately. With smart TRVs you will need to replace the batteries in them from time to time. Again, the systems will let you know in good time that you need to install new batteries. If



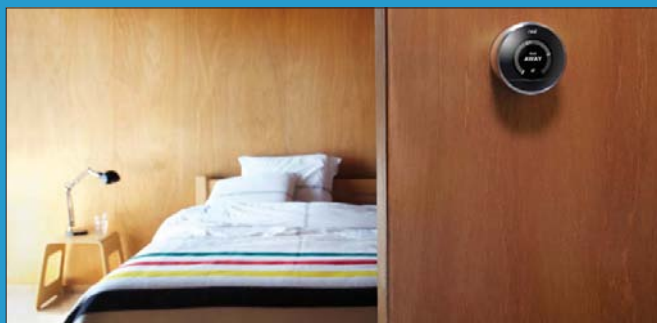
# SMART THERMOSTATS AND STORAGE HEATERS

Smart heating systems and smart thermostat systems are a growing trend, but with little or no knowledge of plumbing you're probably unsure whether they will be compatible with your boiler. After all, do you even know what make of boiler you have? Still, that's nothing a little digging on the manufacturer's website or a phone call to its help team can't solve.

The problem goes beyond the boiler, though. What if you use storage heaters rather than radiators? Storage heaters run on electricity and are entirely separate from your water-heating system. Here we address whether you can use a smart thermostat if you also use storage heaters.

Storage heaters are one of my pet hates. Not only are they not any cheaper than standard heating systems, they also require you to know in advance exactly how much heat you might need the following day. Get it wrong and you'll either freeze or boil, because other than adjusting how quickly your storage heaters release their stored heat.

The sad truth is that you cannot use a smart home thermostat in combination with a storage heater. And while you can still use a smart thermostat with your hot water boiler, there is little point, as will become clear.



Storage heaters are filled with bricks and work by heating them up overnight when electricity prices are cheaper. They come with two manually operated dials: one that lets you specify how much those bricks should heat up in the first place; the other is used the following day to control the heater's vents and, ultimately, how quickly the heater releases its stored heat. Once that heat has gone, it's gone – at least until the next day.

A smart home thermostat is unable to turn those dials on your behalf. It cannot turn on a storage heater in the middle of the day when you want a bit more heat. And it can't turn the heating off when you're too hot: once the heat has been stored in the bricks, it has to go somewhere.

A smart home thermostat won't save you money by turning on the heating only when necessary. Neither can it do fancy things such as set up zones within your home, allowing you to have different temperatures in the living room and the bedroom, nor heat your home to a desired temperature at a specific time. Storage heaters are just too dumb.

However, storage heaters control only the temperature of your home. You will also have a gas or possibly electric hot water boiler, with which you could use a smart thermostat. You would, though, be wasting your money.

For starters, you probably already have a thermostat on that boiler, which lets you control at what time it turns on and off. You'll have this set up so you have hot water at the times you need it. The only thing a smart thermostat could change here is that it would allow you to switch the hot water on remotely. That could be useful if, say, you are coming home a couple of hours earlier than usual and want a bath when you get in. But considering the frequency with which you might use this, a smart thermostat is not worth the expense. **Marie Brewis**

the batteries aren't replaced, the TRVs will be left in the 'on' position, so that you will have a surfeit of heat rather than not being able to operate the heating.

## What happens to smart heating when the Wi-Fi is down?

We'll get to the specifics in a minute, but in general a lack of Wi-Fi affects only the way that you can communicate with the heating and not the heating's ability to operate. In the cases of smart thermostats it generally follows that the heating will continue to act as it did before, and your problem will be with your ability to change the schedule. With the more sophisticated zoned heating systems you will generally find that you have to disable the central hub and make use of the manual controls.

So what happens to Nest Learning Thermostat, Hive Active Heating, Tado or the Honeywell Lyric Thermostat when the power goes off or the Wi-Fi down? As mentioned earlier, if the power goes, then the smart thermostats have batteries for backup power, which kick in and keep things working. If your backup batteries do get low, you'll get a notification on the thermostat itself and via any app you use to control it.

In each case your heating will continue to work if your broadband goes down. Taking Hive as an example – if your system is in auto mode, it will continue to run to your heating schedule. In all cases, you can control your heating settings manually from your thermostat until your broadband connection is restored.

## What happens to Heat Genius and HeatMiser Neo when the power or the internet is down?

As before, lack of internet means only that you lose control. But neither Heat Genius or HeatMiser Neo uses your Wi-Fi to operate, building their own networks instead. So in the case of Heat Genius, the Genius hub will keep trying to communicate with the boiler, which prevents manual operation; unplug the hub and you can use the manual controls. Once the broadband is back, plug the hub back in and it will work as before.

The smart TRVs are powered by battery so they will continue to work. And if the power goes down you should find that the manual controller on the boiler has a backup battery that kicks straight in.



# BEST DIGITAL CAMERAS

Gavin Stoker offers a shortlist of the eight most highly recommended digital cameras you can buy right now





## CANON EOS 7D MARK II

**£1,600** (body only) inc VAT • [canon.co.uk](http://canon.co.uk)

This upgrade of the five-year-old 7D again offers itself up as an APS-C sensor workhorse. That large a gap between models is unheard of for digital cameras, which tells you how respected its predecessor was, as well as how much anticipation there is for a new model. The Mark II arrives priced as a body-only deal, so there is no official boxed option complete with standard lens or lenses. That said, as more than 70 compatible lens choices are offered in the current Canon EF/EF-S line-up, no photographer will be compromised for creative choice.

At the core of the Mark II is a newly designed 20.2Mp APS-C CMOS sensor. The autofocus offers a whopping 65 cross-type AF points for pinpointing your subject no matter where it is in the frame; given that the older 7D was popular with fledgling filmmakers, the video ante has been further upped with Full HD capture at 60fps (720p). There's also a microphone input for more professional sound results via an optional external microphone, plus a headphone jack provided.

Showing its semi-professional mettle by offering a tough, weather-sealed magnesium alloy build and a 100 percent field of view optical viewfinder – so what you see at eye level is what you get in the resulting image – further improvements come in the form of dual-pixel AF, built-in GPS and compatibility with a Wi-Fi unit. Delivering a respectable 610 shots from a full charge is an LP6N battery. Suitable for both amateurs upping their game, or a pro looking for a second camera as backup, the EOS 7D Mark II is compatible with both SD and CompactFlash. This variety also enables video to be written to one card and stills to the other, if desired.

### Macworld's buying advice

It appears Canon has taken the 'if it ain't broke don't fix it' approach with this model. In the EOS 7D Mark II, it has delivered another workhorse for those who don't need the next (larger file size) step up of a pro-grade full-frame sensor, and are happy with the bigger than average standard APS-C chip provided here.



## FUJIFILM X-T1

**£1,0450** (body only) inc VAT • [fujifilm.co.ukk](http://fujifilm.co.ukk)

With an impressively high-resolution eye-level 2.36-million dot viewfinder, as well as the advantage of what is effectively a 16.3Mp APS-C sensor, the Fujifilm X-T1 may well tempt enthusiasts away from rival Olympus and Panasonic Micro Four Thirds systems, and possibly even existing Canon and Nikon owners looking for something more lightweight and manageable than a DSLR. At the same time, as with previous Fujifilm X models, the metal construction of the X-T1 feels solid. It's fast too when compared with its X series predecessors, with an official 0.08-second autofocus response. The X-T1 looks the part for any pro considering a smaller-format camera, being available in a standard black finish or the even more obviously retro-styled Graphite Silver version, announced at Photokina 2014.

We were sent the X-T1 with an XF 60mm f/2.4 prime lens. This fast/bright aperture combined with the fixed focal range allowed us to achieve pin-sharp subjects with attractively defocused backgrounds – in other words a DSLR-type effect, yet from a mirror-less alternative. At times it was tricky to tell the difference between the outputs of CSC and DSLR. So if you've previously weighed up any X-series cameras but were concerned that they didn't look sufficiently 'serious', the X-T1 may well prompt a rethink. An optional vertical battery grip costing £200 provides an opportunity to bulk up the camera further, if you want.

Even without that extra grip, the construction and operation indicate a camera that rises above its stature. There may be fewer compatible lenses for this system than from other well-established brands, but Fujifilm is gaining ground all the time. Plus, with the X-T1 increasingly taken up not just by enthusiasts but pros too, the lens line-up is expanding all the time.

### Macworld's buying advice

If you're prepared to invest in yet another system, this is a sensible place to start. The Fujifilm X-T1 mounts a serious challenge in terms of image quality, challenging only the keenest of eyes to spot the difference between this and a larger DSLR.



### KODAK PIXPRO S-1

**£499** (for twin lens kit) inc VAT • [kodakcamera.jkilt.com](http://kodakcamera.jkilt.com)

Latest Kodak licence holder JK Imaging invited photographers to regain that 'Kodak moment' via the brand's first-ever compact system camera (CSC). Metal-bodied and sleekly minimalist in a white gloss finish or regulation black, it's lightweight too, at under 300g body-only. So if you're weighing up the best camera for your travels or street photography it's a contender. Headline specifications include a 16Mp Four Thirds sensor.

As this is Kodak's first attempt at a CSC, it comes with the advantage of a twin lens kit incorporating a 12- to 45mm zoom (24- to 80mm in 35mm terms), plus a 42.5- to 160mm (85- to 320mm), so you can cover all compositional bases, from ultra-wide angle to extreme telephoto (maximum zoom) out of the box. If you want to go further there's also the pipe-like 400mm f/6.7 fieldscope lens, which is available separately and ideal for wildlife watchers. Handily, the S-1 body offers built-in image stabilisation.

More consciously aimed at customers wanting to trade up from a smartphone rather than professionals, the S-1 lets you frame your shots with the aid of a 3in, 920K-dot LCD. This can be tilted too, which is a real advantage. Shooting selections are made via a familiar bottle top-style mode wheel on the top plate.

Better than most rivals at this price point is the S-1's 400+ shot battery life, and you can shoot uncompressed Raw files alongside JPEG for maximum image quality, as well as record Full HD video clips with stereo sound, and transfer shots via body-integral Wi-Fi. With all the specification boxes ticked, the good news continues in that photos retain sharp detail and rich colour, focusing automatically adjusts during video capture as well as for shooting stills, so imagery remains sharp even if switching subjects.

#### Macworld's buying advice

The Kodak name may no longer be the sexiest branding in the world of photography, but this is a solid performer with a reasonable kit price that augurs well for the future.



### NIKON D810

**£2,700** (body only) inc VAT • [nikon.co.uk](http://nikon.co.uk)

We don't all need massive image file sizes, but if you're looking for the highest resolution available from a full-frame 35mm camera to futureproof your pictures as much as possible, then the 36.3Mp D810 is worth considering.

With a dust- and weather-sealed magnesium alloy body ensuring that the D810 looks and feels like a pro tool, this camera is all about providing photographers with detail. Indeed, Nikon has gone so far as to say that it delivers the best image quality in its history, offering not just the large pixel count, but also an extra degree of detail made possible by the omission of an optical low-pass filter – the sacrifice of this once standard feature is something of an industry trend. Also on board is a latest-gen Expeed 4 processor, which replaces its predecessor's Expeed 3.

Nikon has added a few more extras to this upgrade, including a new quieter shutter unit, a greater number of continuous shots (7fps in 15.3Mp DX crop mode; otherwise 5fps in FX mode), improved auto white balance, plus a 'clarity' option in the picture control settings that enable fine adjustments in 0.25 increments. Otherwise it offers the same 51-point AF system and Group Area AF feature as the flagship D4S.

On the outside the grip has been modified and now enables a firmer more comfortable hold, with an 'i' button giving easier menu access as well as offering a split-screen Live View mode. Incidentally, the 3.2in LCD screen provides an enormous 1229K-dot resolution, which is ideal when you're using it for composing stills or video especially. The latter has also been improved on this model. While you don't get 4K, there is a choice 50- or 60fps at Full HD resolution of 1920x1080 pixels and improved audio recording capabilities.

#### Macworld's buying advice

If you're already a pro Nikon user and want to add a new body to your kit bag, you now have a choice between the range-topping D4S for faster continuous shooting and the D810 for the highest resolution in the line-up.



## OLYMPUS OM-D E-M10

**£700** (with 14-42mm lens) inc VAT • [olympus.co.uk](http://olympus.co.uk)

The OM-D E-M10 is currently the most affordable entry point into the OM-D camera series of classically styled, mini DSLR-shaped, mirrorless models based on the original Olympus OM brand from the 1960s and 1970s. Aimed at the travel and street photographer, this is the lightest and most compact of the OM-D family.

The smaller size of the E-M10 makes it a great option for anyone who wants near-professional-quality images, but don't want a bulky camera with it. That said, Olympus has kept the retro design that initially helped this series stand out from the crowd – until, that is, Fujifilm's X line-up pulled off a similar trick and arguably stole some of the OM-D's thunder.

While not an outright bargain at £700, the price still feels fair. Keeping proportions manageable, the camera comes with the latest-generation ultra-compact 14- to 42mm lens, a mechanical rather than manual zoom, which provides a focal range that is the equivalent of 28- to 84mm in 35mm film terms. The setup means that you can comfortably slot the camera body with its lens attached into a jacket pocket.

In terms of getting creative or shooting candidly, users are spoilt by both a high 1.4 million-dot resolution eye-level viewfinder, plus a tilting 3in touchscreen LCD just below. As with previous Olympus Pen models, the shutter can be fired just by tapping the screen. The supplied zoom comes into its own when shooting Full HD 1920x1080-pixel clips too: not only is it quiet in operation, its transitions are smooth and steady enough to avoid any unsightly jumps. Yes, there's a smaller 16Mp Four Thirds sensor than its rivals with an APS-C chip, but with its colour-rich, high contrast shots, the E-M10 punches above its weight.

### Macworld's buying advice

The E-M10 is an affordable means of entry into Olympus's retro-styled, fully featured OM-D system. It borrows from its big-gun siblings (the more expensive E-M1 and E-M5), yet doesn't cut too many corners in handling and performance.



## PANASONIC LUMIX DMC-GH4

**£1,300** inc VAT • [panasonic.co.uk](http://panasonic.co.uk)

Panasonic's flagship GH4 was the first compact system camera to market with 4K video capture; it has since been joined in the CSC club by Samsung's NX1 and Sony's A7S, which feature bigger core sensors than the Four Thirds chip at the heart of the GH4. It seems only fitting, as Panasonic has long pitched its models as 'hybrids', that this fast and accurate DSLR-alike CSC option appeals to those shooting both video and stills.

While you don't get body-integral anti-shake, the GH4 does offer a reassuringly weighty splash and dust-proof construction comprising an ultra-sharp 2.4-million dot eye-level viewfinder with self-activating eye sensor, plus compositional alternative of tilt and swivel 1036K-dot 3in screen just beneath. Also featured is an improved 16.05Mp Four Thirds-format CMOS sensor, Venus Engine processor and fast and accurate AF system. This makes it a direct competitor to the equally rugged and all-weather shooting Olympus OM-D E-M1, Samsung NX1 and Fujifilm X-T1. The traditional shooting mode dial features the usual full automatic settings, as well as digital effects options. There are eight of these including colour-boosting Expressive mode, plus three user-definable custom settings.

In terms of connectivity, the GH4 offers both Wi-Fi and NFC options. What's more, as 4K video needs both fast and high-capacity media cards, there is compatibility with the latest-generation Gold Series UHS-I SD cards, available up to 64GB. A battery life of 4500 shots is also respectable. In terms of lenses there's the ability to twin the GH4 with the massively useful 14- to 140mm Power Zoom out of the box, which provides a 35mm equivalent film range of double that – providing an all-encompassing 28- to 280mm reach. If you want this as well as the camera body, you're looking at around £1,750 in total at the time of writing.

### Macworld's buying advice

Pitched by Panasonic as a 'hybrid' camera, the DMC-GH4 is a fast and accurate camera that offers 4K video capture.





## SAMSUNG NX1

**£1,300** (body only) inc VAT • [samsung.co.uk](http://samsung.co.uk)

This heavyweight contender from Samsung tops the company's line-up and introduces 4K video shooting to the NX range, along with enough manual control and resolution to tempt conventional DSLR owners into moving across to the electronics giant.

It has a splash and dust-resistant magnesium alloy body, a 30.7Mp sensor (28.2Mp effective), a top-plate status display window, an eye-level viewfinder and a tilting AMOLED touchscreen on the back for deeper blacks and better contrast. Indeed, the only attributes the NX1 is missing to put it up there with the best DSLRs on the market is an internal mirror mechanism and a full-frame sensor. Instead, the camera has a back-illuminated APS-C sensor, although that is still pretty good.

Although the number of compatible lenses may not be on a par with the 60+ volume of Canon or Nikon's optics for their DSLR ranges, Samsung launched more at September's biennial Photokina. These include a 50- to 150mm premium lens that offers a f/2.8 fixed aperture, four ED elements and hypershield coating along with a six-axis gyro sensor for detecting camera shake, and which minimises its effect by the equivalent of 4.5 stops. There is also a 300mm f/2.8 in development plus a vertical grip now available.

While some will gripe that the chunky build (it measures 138.5x102.3x65.8mm) means it won't fit in a pocket, others will be reassured by the larger size.

For £1,300, the NX1 needs to be quick and responsive and here the camera offers up to 70 continuous shots at 15fps plus an AF with 205 phase-detection points. Adaptive noise reduction enables crisp results at higher ISOs, which stretch to the maximum expandable ISO 51200 setting.

### Macworld's buying advice

The NX1 is the clearest signal yet that Samsung is looking not only to compete with Panasonic and Olympus in the top-end CSC arena, but to also attract those who would previously have opted for a camera from Canon or Nikon.



## SONY A7 MARK II

**£1,500** (body only) inc VAT • [sony.co.uk](http://sony.co.uk)

Battling against the likes of the Fujifilm X-T1, the Olympus OM-D E-M1 and the Samsung NX1, the newest model in Sony's A7 Alpha series trumps most comers by incorporating a full CMOS frame sensor (in a relatively compact camera body. The bigger the chip, the better the images, theoretically at least, which is part of the reason why the A7 series, with its largest possible chip in a relatively compact body, has proved so popular.

The A7 is now at the Mark II stage, and is the one and only full-frame camera with optical five-axis image stabilisation, providing the equivalent of 4.5 stops. Autofocus response is 30 percent faster than the previous generation, while startup is 40 percent quicker, too. Coming from an electronics manufacturer, the A7 Mark II's inclusion of both NFC and Wi-Fi connectivity options comes as no surprise, and it's compatible with Sony's existing E-mount lens family, too.

Outwardly suggesting semi-pro status, the Mark II version still resembles a miniaturised DSLR, with the Raw, JPEG and Full HD video-shooting 24.3Mp model also offering a redesigned body. Delivering 3:2 aspect-ratio still pictures, the shutter release button has been placed more forward on the grip and a different type of front control wheel added.

The eye-level shot comes courtesy of 2.36-million dot resolution 0.5in OLED electronic viewfinder (EVF) with 100 percent field of view. Also impressive is wide AF area coverage thanks to a 117-point phase detection AF sensor working in combination with 25-point contrast detection AF to ensure both speed of operation and accuracy along with it. The A7 Mark II has a battery life good for an average-sounding 350 shots.

### Macworld's buying advice

This high-end full-frame compact is faster overall compared with its predecessor. Coupled with the redesigned body, customisable function and settings, it ensures the A7 Mark II provides anyone considering making the leap from a DSLR to a slightly smaller size with a good point to jump aboard Sony's system.



The Fujifilm X-T1 mounts a serious challenge in terms of image quality, challenging only the keenest of eyes to spot the difference between this and a physically larger DSLR

	<b>CANON</b> £1,600 inc VAT (body only)	<b>FUJIFILM</b> £1,050 inc VAT (body only)	<b>KODAK</b> £499 inc VAT (for twin lens kit)	<b>NIKON</b> £2,700 inc VAT (body only)
Model	EOS 7D Mark II	X-T1	Pixpro S-1	D810
Sensor	20.9Mp APS-C CMOS (22.4x15mm)	16.7Mp APS-C X-Trans CMOS II (23.6x15.6mm)	16.83Mp Four Thirds CMOS (17.3x13mm)	37.09Mp full-frame CMOS (35.9x24mm)
Lens mount	Canon EF, EF-S	Fujifilm X	Micro Four Thirds	Nikon FX
Screen	3in fixed LCD (1040K dot)	3in tilting LCD (1040K dot)	3in tilting LCD (920K dot)	3.2in LCD (1229K dot)
Video	1920x1080 pixels at 50fps	1920x1080 pixels at 60fps	1920x1080 pixels at 30fps	1920x1080 pixels at 60fps
Continuous shooting	10fps maximum	8fps maximum	5fps maximum	7fps maximum
Number of compatible lenses	70+	16	3	60+
Weight	910g (body only)	390g (body only)	290g (body only)	880g (body only)

	<b>OLYMPUS</b> £700 inc VAT (with 14- to 42mm lens)	<b>PANASONIC</b> £1,300 inc VAT	<b>SAMSUNG</b> £1,300 inc VAT (body only)	<b>SONY</b> £1,500 inc VAT (body only)
Model	OM-D E-M10	Lumix DMC-GH4	NX1	A7 Mark II
Sensor	17.2Mp 4/3in CMOS sensor (17.3x13mm)	17.2Mp 4/3in CMOS sensor (17.3x13mm)	30.7Mp BSI APS-C CMOS (23.5x15.7mm)	24.3Mp full-frame Exmor CMOS (35.8x23.9mm)
Lens mount	Micro Four Thirds	Micro Four Thirds	Samsung NX	Sony E
Screen	3in tilting LCD (1037K dot)	3in tilting LCD (1036K dot)	3in angle-adjustable AMOLED touchpanel display	3in LCD (1,228,800 dot)
Video	1920x1080 pixels at 30fps	3840x2160 pixels at 29.97fps	3840x2160 pixels at 30fps	1920x1080 pixels at 60fps
Continuous shooting	8fps maximum	12fps maximum	15fps maximum	5fps maximum
Number of compatible lenses	17	16	12	22
Weight	350g (excluding accessories)	480g (body only)	550g (body only)	556g (body only)

# Reviews

£799 inc VAT

## Contact

■ [apple.com/uk](http://apple.com/uk)

## Read more

■ [tinyurl.com/n9zwoxs](http://tinyurl.com/n9zwoxs)

## Specifications

2.8GHz dual-core Intel Core i5 (Turbo Boost up to 3.3GHz) with 3MB on-chip shared L3 cache; 1TB Fusion Drive, configurable to 2TB Fusion Drive or 256GB, 512GB or 1TB of flash storage (SSD); 8GB of 1600MHz LPDDR3 memory, configurable to 16GB; Intel Iris Graphics; 2x Thunderbolt; 4x USB 3.0; HDMI port; SDXC card slot; gigabit ethernet; audio in; headphone socket; IR receiver; 802.11a/g/b/n; Bluetooth 4; 36x197x197mm; 1.22kg

Macworld



## Apple Mac mini (2.8GHz, 1TB Fusion Drive, late 2014)

**S**ure as death, taxes and data loss, there are some givens in this world. One of which is that next year's PC will be faster than last year's. But there is an argument that for the majority of users the desktop PC has already reached 'fast enough' - in terms of processor speed at least, even if it's now apparent that flash storage makes a bigger perceived difference to how quick a personal computer can feel.

However, one thing we don't ordinarily expect is for a newly revised computer to appear that computes more slower than the model that it replaces. Particularly when there's been not one but two long years between the now-obsolete and shiny new editions.

That's exactly what's happened with Apple's 2014 model of the Mac mini though. Today's Mac mini range is in many respects slower than the 2012 range it replaces.

With the entry-level model we reviewed in the previous issue ([tinyurl.com/kfafLj2](http://tinyurl.com/kfafLj2)) there was the distraction of finding the price slashed by one-fifth, from £499 to £399, to sweeten the deal. Inside this new starter model is effectively the same computer as a MacBook Air, albeit working much slower due to the little mini's reliance on a hard disk rather than solid-state flash storage.

That's fine for people working to the tightest budgets who don't require more computing power than is necessary for office duties and some modest creative work. But since the Mac mini launched in 2005, it has developed a cult following from delighted owners who have found the little chap capable of so much more.

The Mac mini has been pressed into service as a graphic designer's workstation, a home media centre for the family, and as a web server for hosting entire commercial websites.

It's been ably assisted in these latter kind of duties with



the introduction of the Intel Core i5/7-Series processors - and in particular, the quad-core editions that first appeared inside the Mac mini in 2011. This was also the Mac mini range where Apple actively encouraged promoting the little mini into front-line server action, issuing a slot-less server edition that packed two hard disks.

Now with the recent updates we find no more quad-core models are available. Standing at the top of the prêt à porter range is the 'best' Mac mini with 2.8GHz Intel Core i5. Given the intervening two years and the upward graph that is the progress of processor performance-per-clock, this model ought to crush the 2.6GHz-powered 'best' of 2012.

In the new corner we have the current best of three off-the-shelf configurations of Mac mini for 2014, here with 2.8GHz Intel Core i5-4308U dual-core processor, Intel Iris Graphics 5100, 8GB 1600MHz memory firmly soldered in place, and a 1TB Fusion Drive.

In the old corner, we have one Apple Mac mini (late 2012) with 2.6GHz Intel Core i7-3720QM. This has been upgraded since new with a 512GB SSD and 16 GB of 1600MHz DDR3 memory from Crucial.

The first test is the cross-platform Geekbench 3, which measures raw processor and

memory performance. The application feeds a computer a series of difficult sums to work upon, such as cryptographic routines, lossless file compression/decompression, ditto for JPEG and PNG graphics, and some Mandelbrot fractal crunching.

Today's best Mac mini scored 3363 points in single-core mode, and 7208 points in multi-core mode. And here, 'multi-core' means dual cores with Hyper Threading Technology, which can give the effect of a virtual quad-core chip when using many modern applications.

Yesterday's best Mac mini scored 3308 points single-core, and 12927 points multi-core. So today's Mac mini showed a 1.7 percent positive increase in point score when mono-tasked; and scored only 56 percent of the older model's speed with multi-threaded applications.

We tested with two different versions of the venerable Cinebench test, v11.5 and v15. In Cinebench 11.5, the top 2014 Mac mini scored 1.38 points single-core, and 3.36 points multi-core, reporting a 2.44-times increase through running simultaneous threads.

The top Mac mini of 2012 scored 1.44 and 6.76 points respectively, with an indicated multi-thread speed-up of 4.7x. So here the later Mac had a 4 percent slower



single-core speed, and had a little over one-third the latter's score running multi-core. In Cinebench R15, scores moved from 126 to 120 points, and from 549 down to 292 points. That represents a 5 percent single-core drop; and a 52 percent reduction in multi-core speed.

In the two years between Ivy Bridge and Haswell generations of processors (2nd- and 4th-generation Core chips), Intel has diverted more attention to the graphics engine that now resides in most of these chips. These graphics solutions now approach what was once only possible with dedicated discrete graphics from nVidia and AMD.

In 2012, the 2.6GHz Intel Core i7-3720QM had a graphics processing section known as Intel HD Graphics 4000, with a base clock frequency of 650MHz, and peak of 1250MHz.

Today's 2.8GHz Intel Core i5-4308U includes Intel Iris Graphics 5100 (not to be confused with Iris Pro though), with a lower base clock of 200MHz and maximum clock of 1200MHz. However the number of pipelines ('execution units') has increased from 16 to 40 in the later processor. Which of these graphics engines is more powerful may depend on the application, our results suggest.

From the Cinebench OpenGL test routines, the older Mac mini played the car animation sequence at 24.1- and 17.4fps, with Cinebench 11.5- and 15fps respectively. The newer Mac mini played the same tests at 28.4- and 25.5fps, vindicating the new graphics architecture with these results showing up to 47 percent faster framerates.

Turning to our standard Mac game tests of Batman: Arkham City and Tomb Raider 2013, however, we found the trend less certain. Where 2012 Mac averaged 42fps when played at (1280x720, Medium), the 2014 Mac fell to 34fps at the same settings.

For Tomb Raider 2013 (using Legacy OpenGL mode), we kept the same half-HD resolution and saw results of 34.8- and 23.9fps, for Low and Normal detail settings. These framerates were barely improved upon by the newer Mac mini, now up to 35.1- and 24.1fps.

Where later Intel chips have made breakthroughs in reduced power consumption, a pivotal trend

that is still improving for the sake of mobile battery-powered computers.

Idle power consumption has plummeted further in the latest revision, down from 10- to just 5W, although peak power consumption was found to have increased slightly from 45- to 50W.

## Ports and connectivity

As we mentioned, it's not all about processor speed, especially if you don't intend running a web server or editing video.

The common bottlenecks that slow down your computer's speed come down to IO - data input/output - and here there is better news for 2014's Mac mini.

Wireless speed using Wi-Fi has potentially doubled, thanks to the implementation of 802.11ac in the current series. Where maximum data transfer with three-stream 11n would be up to around 300Mb/s, 11ac can currently deliver up to around 600Mb/s. Bluetooth 4.0 is unchanged since 2012, as is the collection of four USB 3.0 ports that made their debut that year. But now replacing the FireWire 800 port is a second Thunderbolt port, with both now uprated to Thunderbolt 2 specification.

The total available speed of Thunderbolt 2 should be no different to the original Thunderbolt, as its 20Gb/s specification equals the 2x 10Gb/s of the first iteration of Thunderbolt. But in real-world use there will be applications where a single higher speed channel can be put to better use than two half-speed links.

Besides Thunderbolt to connect a display or two, there's still an HDMI port available on the back panel. This makes it easy to hook up a Mac mini to Full-HD TVs and monitors, for example, although it's less suitable for the emerging ultra-high definition displays now available.

This port is now based on the HDMI 1.4 standard from 2009, and while it can output at resolutions up to 4094x2160 pixels, it is limited in refresh rate to just 24Hz. At the UHD resolution of 3840x2160, it should manage 30Hz, but this is still too low for practical use as a computer monitor, where refreshes slower than 50- or 60Hz typically show conspicuous trails to mouse cursors, for instance.

Storage drive performance has improved thanks to the upgrade to PCIe-attached flash drives. Like previous generation best off-the-shelf model, storage is based on a 1TB laptop-class hard disk, plus an additional solid-state drive of 128GB capacity, these united to form a hybrid Fusion Drive. The difference now is the use of PCIe-attached flash, which means this section is now around twice as fast as it was with a Serial ATA-attached SSD.

Our sample of Mac mini was fitted with a 128GB Samsung PCIe flash drive, and in our tests the larger samples of the same drive can comfortably read and write at around 780MB/s

In other areas the spec remains the same - gigabit ethernet is still the current standard for wired networking, even if 10GbE is seriously overdue as a network connection outside of industry. The memory card slot supports SDXC cards, the current state of the art, while the audio sub-system seems to be the same as before too, with 3.5mm input and output jacks, and digital convertors that support up to 24-bit 96kHz digital audio.

Finally, we must remind you of the change in memory upgrade policy. Where before Apple made RAM changes simplicity itself with a bottom twist-off hatch, it now locks you into one configuration for the lifetime of the product. The core RAM specification is very similar, clocked at 1600MHz, but is a new low-power (LP suffix) type, intractably soldered to the logic board.

As standard this model is fitted with 8GB memory, but if you anticipate pushing it into hard service, or just want to help safeguard its longevity, you may be advised to configure this at time of purchase to 16GB, for an additional £160. But this brings the Mac mini dangerously close to a four-figure £1,000 price, and it becomes harder to justify that when we know that this Mac mini has less than half the full-bore speed available from the older quad-core model.

## Macworld's buying advice

The adage about steps forward and backward comes to mind for the new Mac mini, and your needs will suggest how many this one's taken in each direction. **Andrew Harrison**

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# Mac mini 2014 vs Mac mini 2012



In October 2014 Apple updated the Mac mini. In this comparison, we look at the new model and compare it to the old mini, which offered many features that are not available with the new system.

The old mini wasn't a bad machine even towards the end of its shelf life - it had an excellent Intel Core processor and featured a spin-off hatch on the underside that you could remove in order to add your own upgrades.

## Getting inside

The latest mini is a lot harder to get in to than its predecessor, and once you do, there is less flexibility for updates and upgrades. All is not lost, though; we discovered you can still access the new mini, once you get past Apple's tamperproof screws.

The black plastic lid can still be pulled off, though, behind that there's now an edge-to-edge circular steel bulkhead in place, sealed down with Torx T6T security screws. Apple really doesn't want you to get inside, but with a bit of effort you can get past these screws. Unfortunately, once you do make

it inside the 2014 Mac mini there isn't a lot you can do.

## Updating the RAM

The previous Mac mini shipped with 4GB of memory, but crucially you could upgrade this to as much as 16GB - not only as a build-to-order deal when you purchased the machine, you could buy your own RAM and upgrade it yourself.

Recent Macs are notorious for having their RAM soldered on to the motherboard, so there is no way to upgrade them later should you decide 4GB RAM isn't enough. For example, the RAM isn't upgradable in the entry-level iMac, or any of the MacBook Air models or the MacBook Pro with Retina display. So if that's what you have you are out of luck.

The bad news about the 2014 Mac mini is that its RAM is now soldered on. This means that if you want to add more RAM, you need to make that decision at the point of purchase. When you buy a mini from Apple, you can add 8- or 16GB to the entry-level model, which will set you back £80 and £240 respectively. To

upgrade models with 8GB RAM to 16GB, you'll need to pay £160.

Owners of the 2012 mini are able to buy the 8GB memory from Crucial for £61, while 16GB costs £123. A reasonable saving.

## Updating the storage

It's not all bad news for owners of the 2014 Mac mini, though - you can swap the internal disk for something much faster, should you wish to. You won't be able to use the proprietary PCIe-attached flash drive connector, but if you purchase a mini with a standard hard disk, you can remove it and use that port for storage of your choice.

You could buy the cheapest Mac mini and update the storage to a fast flash storage, for example. Just make sure that the storage is compatible first.

## Processor speed

One reason we were so excited to hear that Apple had updated the Mac mini was that the 2012 models were running what is now an old Ivy Bridge Intel processor. These models featured a 2.5GHz dual-core



Intel Core i5 at the entry-level, and a 2.3GHz quad-core Intel Core i7 processor at the high end.

Throughout 2013 Apple updated its other Macs to run Intel's Haswell processor, and boosted these even more in 2014. Understandably, the 2012 minis were looking dated by the time Apple updated them.

The cheapest of the 2014 minis have the same 1.4GHz dual-core processor and integrated graphics chip as the MacBook Air and the entry-level iMac. Therefore, it was no surprise that the new Mac mini's processor and graphics performance was close to the current MacBook Air range and practically identical to the new £899 iMac. The MacBook Air has the edge due to its flash storage, while the Mac mini and iMac still feature a hard drive as standard.

The other two Mac minis offer Intel dual-core i5 2.6- and 2.8GHz processors, with Intel Iris Graphics. These are comparable to the processors inside the 13in Retina MacBook Pro, but as with the MacBook Air, you can expect the faster flash storage to give these models a boost. The 21.5in iMacs offer 2.7- and 2.9GHz quad-core processors, so even expect them to be significantly faster, even with the burden of movable storage.

### New Intel processors

As we mentioned earlier, the processors used in the 2012 minis might have been old, but they were still fast, and, with the exception of the entry-level model, they were quad-core Intel i7 chips.

The 2014 Mac mini offers only Intel i5 dual-core processor options as standard. There are i7 chips available at point of sale, but these are still dual-core only. We have run full tests comparing the previous generation with the latest Mac minis.

In those tests the top-of-the-range 2014 Mac mini scored 3363 points in single-core mode and 7208 points in multi-core mode. The 'best' 2012 mini (2.6GHz Intel Core i7) scored 3308 points single-core, and 12927 points multi-core. So the latest Mac mini showed a 1.7 percent positive increase in point score when mono-tasked; but scored only 56 percent of the older model's speed with multi-threaded applications.



### What you don't get

The 2012 Mac mini features FireWire 800. This has been replaced by an extra Thunderbolt 2 port, which means that the only remaining Mac to feature FireWire is the non-Retina MacBook Pro (£899).

Nor is there a DVD drive - the mini hasn't come with one since 2011, but you can purchase a SuperDrive from Apple for £65.

You also don't get a mouse, keyboard or display, so when you consider the price you need to factor these in. You may already own a display that is suitable for the Mac mini. A lot of people use the HDMI port to plug their mini in to their TV, making it an entertainment hub.

### Price

Prices for the 2014 Mac mini start at £399. The other models in the range cost £569 and £799.

The entry-level 2012 Mac mini was available for £499, rising to £679 and £849 for the server model (now discontinued), so you are looking at a saving of £100,

£110 or £50, depending on which version you opt for.

There is definitely a psychological advantage in the lower pricing. When you consider that the Mac mini costs the same as the 16GB iPad Air 2 and only slightly more than the 8GB iPhone 5c, we can imagine that a lot of people will be considering spending £399 on a new Mac.

However, you can get a mini for even less than that if you are happy to choose a second-hand model. They are available on Apple's refurbished store, although there were none when we looked. You may also be able to pick up a second-hand mini on eBay.

### Macworld's buying advice

There is a lot to like about the 2014 Mac mini, not least its lower pricing and processor. However, you should note that the 2012 models offer good processors and are upgradable, so if you can get your hands on one we recommend you do. **Karen Haslam**



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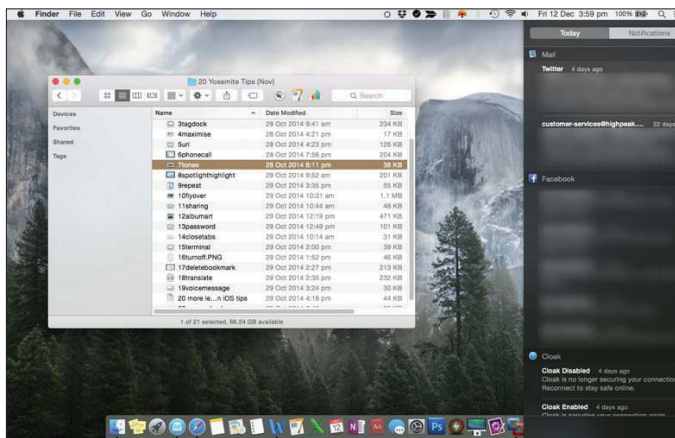
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# OS X Yosemite vs Windows 10



It's been a rough few years for Microsoft. Sure, it still makes more money than several European countries, but the issue has been one of relevance. It missed the boat when it came to mobile and its efforts to repair the situation with Windows 8 were met with laughter at best.

The all-new Windows 10, coming later this year, is designed to stem the blood loss. We take a look at the latest preview and compare it to Mac OS X Yosemite. Windows 10 is a work-in-progress, so we can't form firm opinions but we can certainly start to size up the beast when it comes to the desktop experience.

The final version of Windows 10 is expected to arrive in later this year. Of course, by the time Windows 10 launches we may have a new version of OS X on our hands.

## Price

Apple has been giving its operating system away for free since it introduced Mavericks in 2013.

Microsoft has caught on to this idea and Windows 10 will be a free upgrade for Windows 7 and 8, and Windows Phone 8.1 users.

## Desktop

Yosemite's desktop was visually overhauled with a flat new look, but functionally is mostly identical to earlier releases of OS X. You get the Dock, from which you can launch apps, or open files and folders via Stacks. Mission Control lets you see which apps and documents are open, and switch between them. Spaces

lets you switch between apps running in full-screen mode and also create or switch to additional desktops.

Windows 10 brings back the Start menu that was removed from Windows 8. This is news that will please many, since its removal didn't go down well. The Start menu features some updated graphics that can go full-screen, but it is as functional as ever, if a little click-heavy - to get to your apps you need to click through to an apps listing.

However, Microsoft isn't about to give-up the Live Tile concept that irked so many. For desktop users the Start menu has transmuted into a genuine hybrid - half is a traditional app/files listing, similar to that in Windows 7, while half is Live Tiles. On our test setup this included a News tile, showing constantly scrolling headlines, and tiles for Calendar and Mail apps.

## Notifications

Significantly boosted in Yosemite, the Notification Area lets your apps and OS X tell you important stuff, and also provides a home for widgets that show information such as the weather, or that let you perform quick tasks. It all works harmoniously, while scratching every itch a user might have.

When we looked at the original beta in 2014, Windows' Live Tiles appeared not to have evolved since Windows 8. With a little thought the Live Tile area of the Start menu could be an information hub as well as an app launcher, just like Yosemite's Notification Area. Sadly,

most Tiles appear to be dumb icons. For example, the Mail tile shows the number of unread messages, rather than their subject fields or excerpts. The Calendar tile shows nothing more than the day and date. The Skype tile is simply an app icon, rather than a chance to jump into or respond to a text or voice chat with a contact. All of this may change, though, as Windows 10 is still in beta.

Further to the latest technical preview, we now know that Windows Phone's Action Center will be coming to desktop in Windows 10. It will offer notifications, quick actions and more, similar to the Notification Centre in OS X Yosemite.

In this Notifications and Action Area apps and the system will be able to communicate with the user. It pops-up when you click an icon in the system tray near the clock, and notifications also pop-out in their own windows at the bottom right of the desktop. Clicking entries in the notifications list either clears them, if there's no action associated, or launches the relevant app/system tool. However, there's no way to disable notifications for a short while, as with Yosemite's Do Not Disturb mode.

## Task View

Yosemite firms up Apple's goal for apps to run either as traditional program windows or full-screen. It does this by switching the maximise button to a full-screen option. Working full-screen in apps courtesy of Mission Control and Spaces makes life easier on smaller screens.

As in the Windows 8.1 update, 'Modern' apps designed primarily for tablets start up full-screen in Windows 10, but don't overlap the taskbar at the bottom and also have a traditional title bar. Some can be resized in the usual way, just like any window, while some have fixed dimensions. There's a new menu button at the left of the title bar that provides quick access to features found on the Charms bar in Windows 8, such as settings. This full-screen approach works pretty well, although it has the feel of emulation about it – as if you're using two different computers, with Modern apps providing a peek into a different universe.

To ease the transition into users accepting Modern apps, Microsoft takes the Spaces and Mission Control concepts from OS X. This new Task View lets you switch between any apps running full-screen. You can also create/switch to new desktop spaces. It works well even if it is inelegant – unlike Mission Control you can't click and drag to move apps from one space to another (or at least not in the tech preview we played with). That can be done only by right-clicking the program window thumbnail.

Dragging apps to the left or right of the desktop doesn't switch desktop space. Instead, it activates Windows' split-screen mode, known as Snap. This is designed for tablets and lets you align two apps vertically for multitasking, or four in a grid by dragging apps to the corner of the screen. On a desktop with all but the largest screens this makes precious little sense.

## Mobile integration

Where Apple has always maintained that two separate operating systems are necessary – one for mobile devices, one for computing – Windows 10 will run on PCs, phones, tablets and even the Xbox One. There will no longer be a separate version of Windows for phones. The benefit of this strategy is that the same apps will be available to all Windows 10 devices.

Of course, Apple's philosophy is that an operating system that relies on mouse input isn't suitable for use on a mobile phone where the finger

or thumb becomes the means of input (if you resort to using a stylus on the phone you have failed).

How is Microsoft addressing this issue? Continuum Mode isn't Microsoft's answer to Continuity, it's an answer to the dilemma of what happens when you disconnect the tablet part of the Surface from its base. The Windows OS will detect the loss of a keyboard or mouse and switch to the tablet usage mode.

That said, Microsoft is tailoring the OS to devices 8in and above, with a slightly different version for Windows phones and small-screen tablets. This 'mobile' version of Windows 10 isn't a successor to Windows Phone 8, it's still the same OS as that which runs on PCs, but there are some tweaks. The mobile version includes the ability to float the keyboard around the screen.

## Continuity features

While the operating systems are unique, Apple offers a number of features that unify both OS X and iOS. Apple has unified these features underneath the banner of Continuity and they include Airdrop, which is boosted in Yosemite to let you share files between not iOS devices as well as desktop computers. Windows 10 has nothing similar.

You have been able to send SMS messages to other iCloud users on your Mac since Mavericks in 2013, but now you can text anyone from your Mac, regardless of what smartphone they are using. Also new in Yosemite is the ability to make and receive calls on your Mac using your iPhone number (your iPhone just needs to be nearby with Bluetooth turned on).

The closest equivalent in Windows 10 will be IP-based messaging services and Skype. If you're sending an SMS and both parties use Skype, Windows 10 will automatically flip to Skype so you can have a real-time conversation, whether that's continuing to use IM, or switching to a voice or video call.

## Apps

Apple travelled more than a few steps down the path of unifying work patterns across iOS devices and Macs in Yosemite. Another new Continuity feature lets apps share

data instantly between OS X and iOS. Thanks to Handoff, you can start an email on your iPad and you can pick it up instantly on your Mac, and vice versa. While there are separate versions of, for example, Apple's iWork apps, Pages, Numbers and Keynote, for each device, all documents are kept in sync so that you can easily pick up from where you left off on one device and continue working on another. Since Yosemite all documents can be stored on iCloud Drive and accessed on any device.

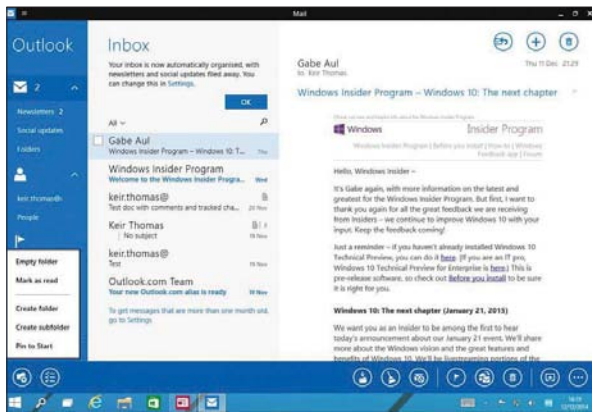
Because it's the same OS across all devices, Universal Apps designed for Windows 10 will work with phones, small tablets and PCs. If you are using one Windows device you should find that apps look and feel the same across different devices and screen sizes. Data will be saved and will sync automatically via Microsoft's OneDrive. Full Word, Excel, PowerPoint and Outlook will be included on phones – complete with the familiar Office Ribbon. The full Word engine will be built into the email app so you can format text just as you would in a document. A recent documents list will be available to all Windows 10 devices.

Many apps are getting an overhaul for Windows 10. For example, the Photos app has been improved so you'll see the same photo stream across your Windows 10 devices. This sounds a lot like the soon-to-launch iCloud Photo Library, currently in beta, which will allow you to access all your photos from any of your Apple devices, and even non-Apple devices via iCloud online.

## App Store

Apple introduced the App Store concept to the world. Microsoft is showing some initiative with its own take on it by unifying the Windows Store across all devices. Desktop- and mobile versions of Windows 10 share APIs, making it easy for developers to create a single app that'll work on tablets and desktop PCs. For users this means simplicity and perhaps the ability to buy an app once and use it everywhere.

In contrast, the iOS App Store and its Mac brother are entirely separate affairs. While there would be little sense in users running



**Post Office** Windows Mail is basic and no use for those who receive more than a handful of messages per day.

most iOS apps on OS X, and it'd be preposterous to suggest OS X apps should work on iOS, the ability to play iOS games on a Mac would be welcome. This is technically feasible using existing software provided to developers, so wouldn't take much adaptation to be integrated into a future OS X.

So, with its improved app store, Windows 10 finally scores a point over Yosemite!

## iCloud vs OneDrive

Cloud storage is a hot area nowadays. Yosemite comes with iCloud at its heart, while apps in Windows 10 will default to saving all files and pictures automatically to Microsoft's OneDrive, as well as backing up your PC settings there. Microsoft Office 365 already features strong OneDrive support, so this is a logical continuation and you can always save files locally.

OneDrive is available on most computing platforms, but the difference between it and iCloud is one of integration. iCloud works as a kind of Dropbox clone in Yosemite, but in iOS each app can claim its own walled garden within iCloud to save data - safe from the prying eyes of other apps or potential malware. Apple's approach is more secure than that of Windows 10, and indicates that more thought has been applied to basic tasks.

## Internet browser

The Safari browser gained much in Yosemite, including a new look with more space for browser tabs, and a significant speed boost. Safari's developers have been focusing on features over the past few years, adding useful tools such as Reading

List for offline browsing, and Shared Links for keeping up to date with your favourite sites and tweeted links. In Yosemite Mail gained the ability to annotate pictures and diagrams - a useful quick tool.

Internet Explorer's user interface is still clumsy, with browser tabs crammed into the top right of the screen alongside the address bar. In terms of features it's straight out of the previous century. Back in 2014 Microsoft was boasting a litany of under-the-hood improvements including HTTP2, but this is like a car manufacturer boasting that its engines have improved sparkplugs.

In the technical preview we learned more about the new Windows 10 browser, 'Project Spartan'. Spartan is built with interoperability in mind, and has a new rendering engine that's "compatible with today's web".

It has a new look and feel, and three significant features. These include a reading mode and the ability to annotate with a keyboard, pen or a finger before you share an article. There's also integration with Cortana. Spartan lets you create a reading list that shows up on all your devices, and this content is then available to read offline.

## Mail

Apple's Mail offered new features in Yosemite including Mail Drop, which takes the hassle out of sending large files because Apple looks after the up- and download of files over 5MB.

The default (and only) email app on Windows 10 is Mail, a tablet app. This is basic. Forget about creating mail rules, for example. Even the ancient Windows Express looks sophisticated by comparison. Anybody who receives more than a few messages per day will be crying out for the likes of Outlook, which comes as part of Office 365.

## Search

The Spotlight search tool is one of OS X's greatest features. It makes the concept of a file system redundant and provides access to all types of data. You can use Spotlight to open files, start apps, search emails, and more. In Yosemite it's also been expanded to perform ultra-rapid web-, Wikipedia-, App

Store- and map searches. Use Spotlight right and it will form the heart of your Mac experience.

Windows 10 gains a new search icon on the taskbar. Type a search term and one of two things happen. If a local result is found then it appears at the top of the search box. Hitting Enter will open the currently highlighted entry in the list. If no results are found you're switched to a full-screen search Modern-style app. This assumes you want to do a web search, and will do so automatically using Microsoft's own Bing search engine. Running along the top of the app are headings to let you search files, settings, and apps. Notably missing is the ability search your contacts or emails.

Luckily, the search feature on the Start menu has been carried across from Windows 7 and provides an arguably quicker and more fuss-free way to search for apps and files. This will display web search results, too.

## Siri vs Cortana

Windows 10 gains Cortana, Microsoft's digital assistant and Siri rival. Cortana is activated either by clicking on a button beside the Start button on the desktop, or by saying "Hey Cortana". You'll be able to edit the things that Cortana knows about you to improve the service it provides. You can also type in your Cortana queries.

Microsoft has pipped Apple to the post here, bringing system-wide voice control to the PC.

## Gaming

Microsoft is bringing Xbox Live to the desktop, with Xbox One games streamed from the console, complete with multiplayer modes and game recording. Another win.

## Macworld's buying advice

There's little we've seen in Windows 10 to get excited about; Yosemite trumps it in almost every regard. Windows 10 feels like an apology for Windows 8, and when the best you can say about a new OS is that it isn't as bad as its predecessor there's clearly something wrong. By contrast, Yosemite demonstrates how an operating system should evolve. As desktop OSes go, it's simply unrivalled. **Keir Thomas**



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**Specifications**

Four-colour (CMYK) A4 inkjet printer; 5760x1440dpi print resolution; 1200dpi scanner; fax machine with 30-sheet document feeder; 9/4.5ppm for mono/colour; 1x USB interface, 802.11n Wi-Fi; 474x377x226mm; 6.2kg

**Macworld**



# Epson Ecotank L555

Inkjet printers are traditionally sold at very low prices, and the manufacturers then make most of their profit by charging high prices for the replacement ink cartridges. That's starting to change, though, with both HP and Epson recently launching new printers that adopt different pricing models. We weren't entirely convinced by HP's 'instant ink' subscription service, but Epson's new Ecotank printers take a much more radical approach.

They turn the traditional printer business on its head, with a higher initial purchase price for the printer itself but much lower costs for ink supplies. And, instead of using small ink cartridges that can only print a few hundred pages at a time, the Ecotank printers have large built-in ink tanks that can hold enough ink to print several thousand pages. There are currently two printers available in the Ecotank range. The L555 reviewed here is a four-in-one multifunction device that costs £330 and includes a 5760x1440dpi printer, 1200dpi scanner and copier, along with a fax machine and 30-page document feeder. It provides USB and Wi-Fi connectivity, though there's no ethernet, which seems like an oversight in a printer that will primarily appeal to business users. The 100-sheet paper tray also seems a little small for a printer that needs to run at high volumes in order to maximise savings.

There's also a less expensive model called the L355, which has the same specification but omits the fax machine and document feeder, bringing the price down to £250.



Rather than inserting a set of small ink cartridges into the print mechanism, the L555 has a set of large ink tanks bolted onto the right-hand side of the printer. It's a clever idea, but filling the printer up with ink for the first time is a bit nerve-racking, as you have to unhook the tanks from the side of the machine and then squirt the ink in using four separate bottles for the cyan, magenta, yellow and black inks.

Epson quotes speeds of nine pages per minute for mono printing and 4.5 pages for colour. During testing, we recorded 8.5- and 4ppm respectively, which is modest for a printer in this price range.

We can't fault the print quality, though, as the L555 produces text that is close to laser-quality, and good graphics output. It also produces bright and bold photo output when using glossy photo papers. Again, a speed of three minutes for an A4 photo print isn't

fast, but the quality is more than adequate for printing marketing brochures and product photos. The real attraction, though, is the long-term cost of using the printer. The L555 costs £330, and includes enough ink to print 4000 mono pages and 6500 pages in colour. We estimate that producing the same number of pages with a conventional inkjet printer would cost more than £500 for the ink alone. That makes the L555 a real bargain in the long run, even if the initial purchase price is relatively high.

Replacement inks are very affordable, too. A bottle of black ink costs £8 and will last for another 4000 pages, which works out at just 0.2p per page. The three coloured inks also cost £8 each but last for 6500 pages, which comes to just under 0.4p per page. Those prices are far lower than any conventional inkjet printer currently available, so you'll definitely save a lot of money in the long run.

## Macworld's buying advice

If you just need a personal printer for occasional use, then you may still be better off buying a conventional low-cost inkjet printer. However, the Ecotank printers offer big savings for businesses that need to print text and graphics documents on a daily basis. There are a few rough edges, but Epson's Ecotank printers represent a real breakthrough in the cost of printing. **Cliff Joseph**



**£269** inc VAT**Contact**■ [synology.com/en-uk](http://synology.com/en-uk)**Read more**■ [tinyurl.com/m643bsg](http://tinyurl.com/m643bsg)**Specifications**

4-bay NAS drive chassis; Synology DSM 5.0 operating system; drive bays for 4x 2.5/3.5in SATA drives (not hot-swappable); 1x gigabit ethernet; 1x USB 3.0, 1x USB 2.0; 2x 75mm cooling fans; external 90W power adaptor; 168x184x230mm

**Macworld**

## Synology DS414j

**F**or home users who need a decent amount of network storage on tap, it's possible to build a network-attached storage (NAS) box around a simple two-bay device. In fact, with single hard disks now running up to 6TB capacity, you might be able to accommodate all your data needs with a single huge disk.

A four-bay NAS drive like the Synology DS414j may seem a superfluous luxury then. But there are good reasons why four disks is the sweet spot between capacity, security and performance. With just two disks on-board, you get the first options of a RAID configuration – either striping them together to get maximum capacity and performance (RAID 0), or mirroring the two disks for safety (RAID 1).

Stretch up to four disks though, and you get the benefit of decent size, performance and some leeway of safety if one disk should fail. This would be with a RAID 5 setup, where you get around three-quarters the sum of equal-sized disks.

The alternative for this NAS is what Synology calls Synology Hybrid RAID (SHR). This uses a Linux mdadm utility to allow disks of different sizes to be used without sacrificing so much total space – otherwise, with different-sized disks you'd only get an overall capacity based on the sum of the smallest of the array.

Synology's DS414j is the entry-level four-bay unit from the NAS specialist. As such it's made some economies in its specification to keep the price down, principally in the all-important processor.

Where the next model up – the DS414 without the j – has an ARM dual-core system-on-a-chip (SoC) from Marvell, namely the 1.33GHz Armada XP, this junior version of the NAS has an even cheaper chip in the form of the improbably named 1.2GHz MindSpeed Comcerto 2200.

This processor from lesser-known fabless firm MindSpeed is also a dual-core ARM Cortex-A9 design with built-in crypto engine to allow hardware encryption. MindSpeed is now owned by Motorola's spun-off

semiconductor company Freescale.

The DS414j has a minimal amount of memory to run the system, 512MB of DDR3 RAM, and a single gigabit ethernet port for joining your wired network. For connecting outboard storage drives it includes two USB ports, one each of USB 2.0 and 3.0; both at the back.

The outward industrial design of the DS414j follows the desktop bread-maker shape introduced with the DS408, then redesigned into the form we see today with the DS409 facelift in 2009. Unlike the rest of Synology's current range, this chassis is not made for hot-swapping disk drives.

The DS414j runs the same operating system as all other Synology NAS drives, currently DiskStation Manager 5.0. This is a welcoming interface, modelled on the flatter, squarer look of Windows 8 and iOS 7/8, with most elements for configuring and maintaining the DiskStation accessible from a central control panel.

All the usual functions of a NAS drive can be engaged here, such as Windows and Mac file serving, FTP server, and a plethora of optional apps to further extend functionality. With the help of the Package Center you can install added Synology applications such as Media Server and Surveillance Station. There's also a growing ecosystem of third-party apps, including WordPress and Drupal for hosting a website.



We set up the Synology DS414j with four 2TB WD Red disks, and configured these into a RAID 5 array for that useful balance between performance, capacity and limited redundancy.

Tested in Windows 7 first, we assigned our test volume with a drive letter so that it could be treated like an attached volume. We saw read speeds up to 118MB/s and write speeds up to 98MB/s, when measured by the somewhat flattering ATTO Disk Benchmark speed test. Stepping back to CrystalDiskMark benchmark test, sequential reads extended to 76MB/s while sequential write reached 88MB/s. When confronted with a stream of smaller 0.5MB data files, the speed changed little from CDM's headline speed, maintaining 74- and 68MB/s respectively. At the smallest file level of 4kB random read/writes, the Synology with its WD disk payload measured 4.7- and 7MB/s. Stacking up the threads, the QD=32 result was a useful 29- and 1MB/s for 4kB random I/O.

Power consumption was suitably low, peaking at 24W with its four WD Red disks spinning and under load, falling to just 7W with the disks spun down and the system idle.

### Macworld's buying advice

The Synology DS414j is well-made and packs enough power to not embarrass itself in basic benchmark tests. **Andrew Harrison**

**£770** inc VAT

**Contact**

■ [seagate.com/gb/en](http://seagate.com/gb/en)  
■ [Read more](http://tinyurl.com/ma4n8Le)  
■ [tinyurl.com/ma4n8Le](http://tinyurl.com/ma4n8Le)

**Specifications**

4-bay NAS drive; 1.2GHz Marvell Armada single-core ARM processor; NAS OS 4.0.94; 512MB DDR3 RAM; 2x gigabit ethernet; 2x USB 3.0; 173x173x217mm

**Macworld**



## Seagate NAS 4-Bay

A complete network storage solution and private cloud for power users – that's how Seagate bills its latest NAS drive.

The industrial design of this near-cubic black box is even sleeker than before, in all black finish with notably sharp corners and similarly square detailing. It's Windows 8 gone all noir, which we found here to make a not entirely unattractive overall impression. The light-sinking blackness is provided some relief by a line of brilliant white LEDs on the fascia, including four that flicker for individual disk activity.

Construction is all plastic – front, sides and back. This NAS box follows the usual approach of front-loaded hard disks, these mounted in individual caddies which are removed by pulling on small lever tabs at the top. Two gigabit ethernet ports are included at the back, as well as a single USB 3.0 port and large integral cooling fan of 120mm diameter. There's another USB 3.0 port at the front of the box.

Powering the Seagate NAS 4-Bay is a 1.2GHz ARM processor, a single-core Marvell ARMADA 370/XP. That may be a step up from the rather pedestrian 700MHz Cavium Econa CNS3420 dual-core ARM we found in its predecessor. Besides a higher aggregate clock, the Marvell has a slightly later ARMv7 architecture, against the Cavium's ARMv6. Memory is also expanded, from the Business NAS' paltry 256MB to a still rather limited 512MB DDR3 RAM.

This Seagate NAS 4-Bay is running a new version of the company's Linux operating system, now up to NAS OS 4.0. This offers a trendy Windows 8/iOS 7-style interface that's sparse-looking and with thin-weighted sans-serif typography and upper-case text.

Main options are listed textually down the left-hand side of the interface, and clicking a selection here brings up the relevant controls in the main pane on the right. Beside the usual SMB and AFP file services (both on by default) there are software servers for (S)FTP, UPnP/DLNA and Time Machine, among



others. Fine-grained control over some features is missing as far as we could tell; for example, limit on space available for Mac backups through Time Machine.

We tested the unit with four 4TB Seagate NAS SATA disks preloaded inside. Windows and OS X computers were used, and both SMB and AFP filing protocols. The NAS was tested with its default SimplyRAID configuration, which gives one-disk fault tolerance on a four-disk array, just the same as RAID 5.

Tested in Windows with the easy ATTO Disk Benchmark test, the software indicated read speeds up to around 110MB/s and write speeds to 55MB/s, which are good results although this test has the least correspondence with real-world performance. CrystalDiskMark showed a maximum sequential write speed figure of 52MB/s. The sequential read speed here was only 64MB/s, although this test in CDM should not be trusted when testing network storage.

Single-threaded 4kB random reads and writes were reported as 9.6- and 5.3MB/s respectively. Using the benchmark software's highest queue depth of 32, random read/write activity could reach 28- and 20MB/s respectively.

The slowness issue was most apparent when connecting to a Mac via AFP. And by default, we found that only the AFP service is broadcast over Bonjour, so that is

the way that most Mac users will connect this drive. Best performance with 'large' (2- to 10MB) files tested in QuickBench showed average speeds of 109MB/s reads but just 21MB/s writes. When tested with the 'extended' data set (20- to 100MB), which usually returns best possible results, write speeds rose slightly to 29MB/s; but read speeds tumbled to just 62MB/s when averaged.

Most troubling was the small-file transfer speeds. Whether using sequential or random-access tests, the Seagate NAS returned figures of 45MB/s for reads, and 2MB/s for writes (averaged with 4- to 1024kB files). Looking specifically at 4kB data, write speeds dawdled at just 0.06MB/s, or 60kB/s.

At that speed, assuming you wanted to fill the 12TB available space just with 32kB text files, with the drive working at its top speed, it would take over nine months to copy all your files across to it. That should give pregnant pause for thought. File writing performance using SMB in OS X was somewhat better for small file transfers. Here we recorded average reads at 25MB/s and writes 19MB/s.

### Macworld's buying advice

The Seagate NAS 4-Bay is a handy self-contained storage solution, with one of the world's few remaining disk manufacturers putting its disks into a working network-attached storage basket. **Andrew Harrison**



# Help Desk

Answering your questions about getting the most from your Mac and iOS device

## iOS and Mac SOS

Solutions to your most vexing Mac and iOS problems

BY CHRISTOPHER BREEN

### Make copies of all your old camera's pictures

**Q:** I've had a number of digital cameras over the years and I'm interested in retrieving images from one of these. How can I find them?

Kevin Kinkaid

**A:** There are two methods of finding these. The first is to open iPhoto, choose *File → New Smart Album*, and in the sheet that appears create a condition that reads *Any Text Contains [camera model]*, where the last entry is the model iPhoto recognises for your camera. (If you're not sure how iPhoto identifies your camera, just select an image taken with it and click the Info button at the bottom-right of the iPhoto window. In the resulting Info pane look near the top for the model number.)

This is the easiest method, though, it may not be the best. When we tried this with images taken with an old Nikon Coolpix 950, iPhoto produced not only the original images, but some thumbnails as well. (The blame for this can be laid at our feet as it seems we performed some import goofiness years ago and cluttered up our iPhoto library with these things.)

One way to eliminate this would be to additionally filter images by their size. If we set the bar high enough, none of the thumbnails would appear. Regrettably, iPhoto's smart albums don't let you use size as a condition.

Automator, however, does. And that's the other option. Launch it and from the workflow template select *Workflow* and click *Choose*.

In the Finder, navigate to your iPhoto Library archive (found in *youruserfolder/Pictures*, by default), Control-click (right-click) on it, and choose *Show Package Contents*. From within this folder drag the *Masters* folder into the Automator



Nikon Coolpix 950

workflow area. This will create a Get Specified Finder Items action. While still in the Finder create a new folder and call it 'Copied Images'.

In Automator, select *Files & Folders* from the Library pane and drag the following actions into the workflow area: *Get Folder Contents*, *Filter Finder Items*, and *Copy Finder Items*. In the *Get Folder Contents* action enable the *Repeat for each subfolder found* option.

For the *Filter Finder Items* action create one condition that reads *Any content contains [camera model]* (again, entering your camera model). Click the plus (+) button to the right and create another condition that reads *Size is greater than 750KB*. This should eliminate any thumbnails. Configure this action to read *All of the following are true*.

Finally, move back to the Finder and drag the *Copied Images* folder you created to the *To* pop-up menu found in the last action. You can save the workflow, but if this is a one-shot deal, click the *Run* button at the top of the window. The workflow will copy all the larger images taken with that particular camera into your *Copied Images* folder.

### Keep iCloud Keychain from adding old email accounts

**Q:** Since I upgraded to Yosemite, the Mail app has started asking for passwords for accounts that I no longer use. I didn't add them when I first set up Yosemite. What's going on?

Carrie Lane

**A:** iCloud Keychain is what's going on. At one time you added these accounts to another device you own. When you enabled iCloud Keychain on that device, it made note of these accounts. When you then set up Yosemite and enabled iCloud Keychain on your Mac, iCloud – thinking it was doing you a favour – added those old accounts.

Regrettably there's no way to edit out this kind of thing in iCloud Keychain – where you can dictate: "Sync this one, but not that one." But hope isn't entirely lost.

As we suggest below (see next question), you can often put iCloud Keychain to rights by switching it off on every device associated with it, locating the device that has just the information you want synced, configuring iCloud on that device, enabling iCloud Keychain on

that device, and then enabling it on your other devices. iCloud should update all your devices with the information from the ‘master’ device.

But email accounts are trickier because sometimes we want one collection of accounts on Device A and a different collection on Device B. (When Device A is your personal Mac and Device B is your work Mac, for example.) The Internet Accounts system preference provides a way to deal with this.

Open it up, select an account that you don’t want to use on your Mac, and click the minus (-) button at the bottom of the accounts pane. A sheet will appear that offers three options: *Remove From All*, *Cancel* and *Turn Off Account*. Click *Turn Off Account* and you should see no evidence of this account in the future. If, for one reason or another, that doesn’t work, you can simply disable any options the account has – switch off Mail, Contacts and Calendars, for instance.

## What to do when iCloud Keychain fails to sync

**Q:** When upgrading to OS X Yosemite on my iMac, I installed it on an external drive. Even though I’ve switched on and verified Keychain in the iCloud system preference, Safari doesn’t know my previously saved passwords. When I launch Safari, open its preferences, and click on the Passwords tab, the area below is empty. Is there a file I need to copy from Mavericks to make this work?

David Collins

**A:** You needn’t do that. Rather, you just have to give iCloud Keychain a nudge. Apple outlines the steps for doing so in its *Get Help Using iCloud Keychain* ([tinyurl.com/nc4naew](http://tinyurl.com/nc4naew)) document.

What Apple suggests is that you switch off iCloud Keychain on all devices that use it. Then, figure out which of your

### In the clouds

iCloud Keychain keeps your passwords, up to date across all of your devices.

devices has the most up-to-date list of your passwords and switch on Keychain for that device. And finally, turn on iCloud Keychain for all your other devices. This should cause Safari to produce the passwords you’re looking for.

A shorter route is to switch off Keychain on your Yosemite drive, restart your Mac from the Mavericks drive, switch Keychain off and on, switch back to your Yosemite drive, and enable Keychain there. If you’re successful you’ve saved repeated trips to Settings/System Preferences on your other devices and countless keystrokes as you re-enter your password and verify iCloud Keychain on another device.

## Email tip every Mac user should know

**Q:** I upgraded my iPad mini to iOS 8, and now an accidental left swipe wipes out an email message. A gentle left-swipe displays More, Flag and Trash options, but a quicker swipe produces a brief narrow red line and the message is gone into cyberspace. Can you help?

Nancy Hilton

**A:** As you’ve rightly deduced, this is a behaviour introduced with iOS 8, and it works across iPads, iPhones and iPod



touches. It was a notion Apple introduced with the idea that it’s an easy way to quickly delete messages. The problem is that if you’re a little too quick in your swiping you can delete messages.

For IMAP accounts these messages should appear in the Trash folder of the associated account. Just navigate back to that folder and move the messages back to the Inbox. But that’s tedious when there’s an easier way.

Shake it. And by “it”, we mean your iPad (or iPhone or iPod touch). This is the undo gesture that far too many of us forget about. When you’ve inadvertently deleted a message, give your iPad a vigorous shake and an Undo Trash window should appear. Tap *Undo* and the message will reappear. (We say “should” because while this works well with an iPhone, we’ve found it can be hit-or-miss on an iPad Air.)

“But hold the darned phone,” we hear. “Within the Mail, Contacts, Calendar setting there’s an *Ask Before Deleting* switch. Surely if you enable that switch you’ll be queried before another message vanishes.” Unfortunately, no. This applies only to those situations where you tap a message to reveal it and then tap on the Trash icon at the bottom of the screen. It won’t interfere with swipe-deletions.

Likewise, although you can tap *Swipe Options* in the Mail, Contacts, Calendars setting; tap *Swipe Left*; and then tap *None*; this doesn’t prevent the rapid swipe gesture from deleting messages. It only allows you to switch the Flag option on or off.

It’s an easy way to quickly delete messages. The problem is that if you’re a little too quick in your swiping you can delete messages

# Keeping it simple

Why it can be okay to use weak passwords (sometimes)

**S**plashData's yearly list of the most popular passwords is back – and it's topped by 'password' and variations on the code an idiot would have on his luggage. It's a chance for techies to feel smug about using a random combination of numbers, letters and symbols – and for journalists to write the same old pieces gently chiding readers to use better passwords.

However, it can be good to use bad passwords – and if others think the same, then it could show that the premise of those articles and SplashData's press releases is a load of old 4c#fRTO.

This premise is that simple passwords – especially using obvious words such as 'password' and your children's names – are easy to hack. Therefore, you should always use more complex ones, using a long random barrage of characters. You should also use a different one for each site, in case one site is hacked and those responsible try to use your email and password on other sites.

Unless you have an eidetic memory, this is unrealistic. Instead, you let your browser remember all of your passwords except your bank (and hopefully any online stores that have your card details) and you do one of three things. You use the same strong password (or a small selection of) for all sites, you keep a list of passwords somewhere handy or you have a few strong passwords for a small number of key sites and a few not-particularly-strong-but-easy-to-remember passwords for the rest.

The first approach leaves you vulnerable if hackers get a long list of email addresses and passwords from say, Adobe, and then use those to get into Amazon or your bank.

The second seems like the weakest, but is pretty secure. First, you need to ensure all of your passwords end in the



same four numbers. Then write your list of passwords in a Google doc or Evernote or wherever, but without those four digits. And don't forget your Google or Evernote password. The downside, this requires writing them all down and who's got time to do that when there's Facebook, Twitter and the new series of Sons of Anarchy on Netflix to catch up on.

The third means you have strong passwords for the sites that matter – your bank, Facebook, Twitter, Amazon, et al – and you stick one of the simple ones in when you feel a strong one is unnecessary (or that a password

shouldn't be necessary at all): forums, mailing lists, online stores you probably won't order from again (so you're not gonna let them keep your card details).

One potential problem here is that occasionally you sign up for a site or service that seems unimportant, but later it becomes something you should be more careful about. Adobe's a prime example of this, where lots of designers signed up for an Adobe ID over many years for freebies or to use the company's forums – then later needed to use that account to pay for subscribing when Adobe changed its business model. So when the company was hacked, a lot of terrible password use was exposed.

If people are using this third approach, then perhaps they aren't as stupid as SplashData is making out. Maybe they're using those stupid passwords on a large number of immaterial sites, but using strong ones on the sites that matter – sites whose password engines won't let you use those weak ones anyway.

So maybe people aren't stupid. Or maybe they are. A regular reminder of the importance of passwords is good, but let's not take SplashData's data at face value.





# Tips for locating iPhoto images

Christopher Breen's tips will help you find old iPhoto images you thought you'd lost

Let's start with EXIF data. Images you take with a digital camera have metadata implanted in them. Using iPhoto's Search field you can, well, search through this metadata. By doing so, you can identify (and possibly eliminate) certain images.

For example, let's say that you want to locate all the images shot with the front camera on an iOS device. All you have to do is enter the word 'front' in the search field. If you click *Info*, you'll see some of the EXIF data at the top – the word 'front' will appear here, so is searchable.

Alternatively, let's look for photos taken around the holiday season in 2014. To do that, click on the Search field triangle, choose *Date* and navigate to the year 2014. Any months within this year that contain images appear in bold text. If you click a month, you'll see any images taken during that period.

To narrow down your search, click this small triangle to see a month view. Any days that have images associated with them are likewise in bold. You'll see a range of dates by dragging on dates in the calendar or choose non-contiguous dates by ⌘-clicking on them.

Or let's say, for example, that you want to find any videos shot with an iPhone or



other camera that uses the H.264 video format. Just enter H.264 in the Search field and they'll appear. And while you have them, press ⌘-A to select all of them and then choose *View* → *Keywords*. In the Keywords field that appears, enter the word **Video** and press Return. Now, when you want to search for your videos, you can instead just enter the Video keyword in the Search field.

And then there are smart albums. The Search field is great, but it allows you to search for one thing only. If you would like to search by multiple factors,

**Part time** You can find photos taken at Christmas 2014, for example, by choosing *Date* in the search field and clicking 2014.

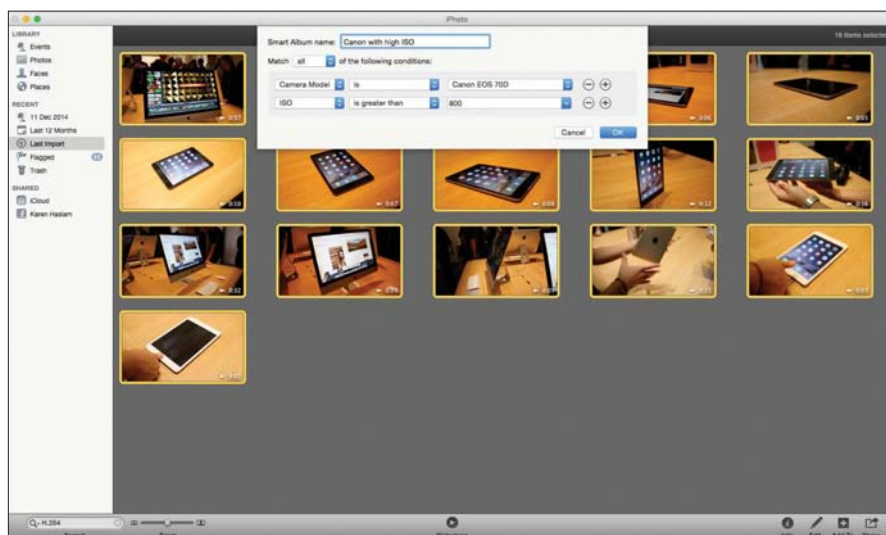
choose *File* → *New Smart Album* and start creating conditions.

For example, if you want to find images shot at a high ISO, you'd choose the Camera Model – in the screenshot left, the Canon EOS 70D – and ISO greater than 800. Click on the Photos menu and hold down the Alt key. You can move selected images to the trash.

You can use a date trick here as well. You could search for images taken during the recent holiday season with a Nikon DSLR by configuring a smart album that has conditions that read Camera is Nikon D750 and Date range is 12/15/2014 – 12/31/2014.

The thing is that digital cameras and devices like the iPhone make it really easy to take pictures, and that's great. But with that power comes the responsibility of finding new ways to locate the images that are most important to you.

**Camera model** You can search for images taken by a specific model of camera.



# New & noteworthy

Ashleigh Allsopp presents the best new iPad and iPhone accessories

## Scosche boomBOTTLE+ >>

£120

scosche.com

Following on from the successful boomBOTTLE, Scosche has released a new and improved version of the Bluetooth speaker, which is particularly suited for cyclists and other outdoorsy types. It's designed to be rugged and portable, with an IP67 water- and dust-proof rating, and the ability to be slotted into a bicycle bottle cage. It can provide up to 11 hours of music streaming, and it can help recharge your iPhone, too. The boomBOTTLE+ is available in a variety of colours.



## Braven 805 >

£179.99

braven.eu

The new addition to the Braven family comes in the form of the 805, a wireless Bluetooth speaker that's available in nine colours. In addition to letting you stream music from your Mac, iPhone or iPad, you can also use the Braven 805 to charge your devices via USB, and make hands-free calls thanks to the built-in noise-cancelling microphone. If you've already got a Braven 850, 855s, 1100 or BRV-HD speaker, you can pair it up with the 805 for stereo sound.



## FiftyThree Gold Stylus >

£49.99

amazon.co.uk

FiftyThree has unveiled a new version of its popular Pencil stylus for iPad and iPhone in a gorgeous gold colour to go with the gold iPhone 6, iPad Air 2 and iPad mini 3. The stylus is designed to allow you to draw lines of any thickness, as well as erase and blend without any technology getting in the way of your drawings. It works best with FiftyThree's Paper app, connecting to your iPad or iPhone via Bluetooth, but is also compatible with other applications. It charges via USB and will last for up to a month on one charge.





## Philips Fidelio M2L headphones

£200

[philips.co.uk](http://philips.co.uk)

These headphones from Philips are among the first to use Apple's Lightning connection rather than the 3.5mm jack port to connect to your iPhone or iPad. The high-resolution audio cans are designed with detail in mind, and are aimed at audiophiles looking for top-quality sound. They're made with leather-covered memory foam ear pads for comfort and style.

## Oloclip lens for iPhone 6/6 Plus

£69.99

[olloclip.com](http://olloclip.com)

We've loved Oloclip's previous products, so were pleased to hear that the company has released a new version of its 4-in-1 camera lens for the iPhone 6 and 6 Plus. It sits over the corner of the iPhone and allows you to capture even better photos, including fish-eye, wide-angle and two levels of macro.

What's more, the new design allows you to use the lenses on the front or rear camera, so you can even improve your selfies.

The Oloclip is portable, too, and comes with a wearable pendant that you can attach to a belt or your keys, so that it is always with you when you need it.



## CATWALK The best-looking cases for your iPhone

Proporta Herraz  
case for iPhone 6  
£24.95  
[proporta.co.uk](http://proporta.co.uk)



Adopted Leather Folio  
Case for iPhone 6 Plus  
£40  
[store.apple.com/uk](http://store.apple.com/uk)



Incipio Trestle case for  
iPhone 6/iPhone 6 Plus  
£27  
[incipio.com](http://incipio.com)







# What is Apple's HomeKit

Apple hopes its HomeKit will simplify controlling the smart home. Martyn Casserly reports

It was back in June 2014 when Apple announced its Smart Home platform 'HomeKit', and we're still waiting for the first fruits of this potentially groundbreaking home-automation system to appear. Rumours have begun to surface recently, though, that manufacturers are gearing up to release various products in early 2015 that will utilise HomeKit. So the curtains could soon be drawn back on the digitally enhanced home of the future. Before long you may be controlling various elements of your house remotely from the comfort of your iPhone 7.

## What is a Smart Home?

The idea of an intelligent home has been around for decades. Back in the 1950s visitors to Disneyland could tour a conceptual 'Home of the Future' in all its

plastic-infused splendour. But whereas that dwelling centred on disappearing shelves and storing irradiated food, there was, of course, a lack of electronic interfaces for the modern household.

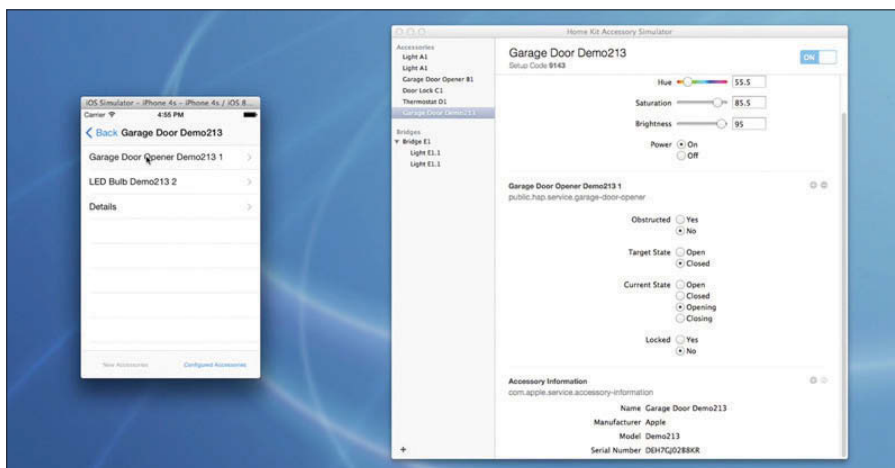
Until recently Smart Homes were something we might have aspired to if and when we became wealthy. It was all about tricking out our homes with elaborate, voice controlled computers, automated mood lighting, and self-closing curtains.

These days more and more people have smart devices in their home that can be controlled via smartphones. From thermostats that are intelligent enough to know what temperature it should be, based on your usual needs (see page 40), to security systems that send alerts to your iPhone along with images of potential burglars.

These devices and apps are going to become a big deal over the next few years, and Apple's HomeKit system looks set to be a significant player. One reason why home automation devices are becoming more widely available is the rapidly falling prices of the technology. In a few years from now your bin might tell the council when it is full, and the tyres on your average car will let you know they need inflating.

## Home Automation

Home automation could benefit from Apple's track record of taking a technology and making it user-friendly and mainstream. At the moment, those with smart gadgets in their home likely have a number of separate apps on their phones and computers for controlling



**Getting integrated** The HomeKit Accessory Simulator will be used by developers to design their integrated systems.

compatible products if they sign up to its MFi programme. This means that, as long as your lights or alarms are made by an Apple-approved device maker, you will be able to use its system to control them. Apple will then sell these products in its High Street stores. In fact a quick perusal of the online store reveals that there are already several automated home items available that will presumably be upgraded to HomeKit once the system is officially launched.

These products could include Philips' popular Hue series of light bulbs, which can change colour and have their brightness controlled via the existing iOS app. Then there's the Kevo automated door lock that can be opened by having your iPhone in close proximity. Nest's learning thermostat has been a big success already, and lends itself nicely to the automated nature of HomeKit. Other possibilities include baby monitors, garage doors, media systems and whatever bright ideas developers come up with in the coming months.

## Apple's partners

Apple has already announced partnerships with a number of manufacturers leading the way in home automation. These include Philips, Withings, Netatmo, Kwikset, and several others, many of whom already sell products in the Apple store.

## How it will work

At WWDC 2014, Apple's senior vice-president of software engineering Craig Federighi explained that "there are a lot of great home automation devices coming on the market these days, and they have companion apps – things like lights and door locks and thermostats. But, you know, each of them have their own application, and they end up defining their own network protocol, their own security mechanisms. Well, we thought we could bring some rationality to this space."

HomeKit, then, is a common network protocol that these devices can employ,

them. Apple would integrate everything into one solution and tie all of it together with one app that runs on iPhones, iPads, Apple TV and Macs.

Privacy and security are also both huge factors when dealing with homes. Apple recently announced new rules to its potential HomeKit partners, stating that any sort of information gathering for advertising or data mining would be strictly forbidden. Even the devices themselves must include Wi-Fi and Bluetooth chips from specific manufacturers, presumably so that Apple can monitor the kind of products being created for its HomeKit customers.

Another reason why the company is well placed in this market is that the 'early adopter' types with money to spend are likely to already own its devices. It's also a concept that hits home for Apple. The tech giant has been there before, when it pioneered the idea of a home hub. Back in a 2001 keynote address at the Macworld conference, Steve Jobs introduced the vision of a home hub with the Mac serving as the household's central controller of entertainment and productivity. This could be the natural evolution of that concept. Then there's the fact that Apple has already made moves to integrate iOS with automotive information and entertainment systems in CarPlay, so why not do the same thing in the home?

## When will devices be available?

While Apple has yet to officially launch the HomeKit platform, things seem to be gathering pace. In a recent Forbes interview it was confirmed that Broadcom,

one of the three companies allowed to distribute HomeKit-compatible microchips, has begun shipping the initial batches to device manufacturers. "Everyone's getting ready," revealed Brian Bedrosian, senior director of embedded wireless in the mobile and wireless group at Broadcom. "Expect to see new product launches in the next cycle of product releases."

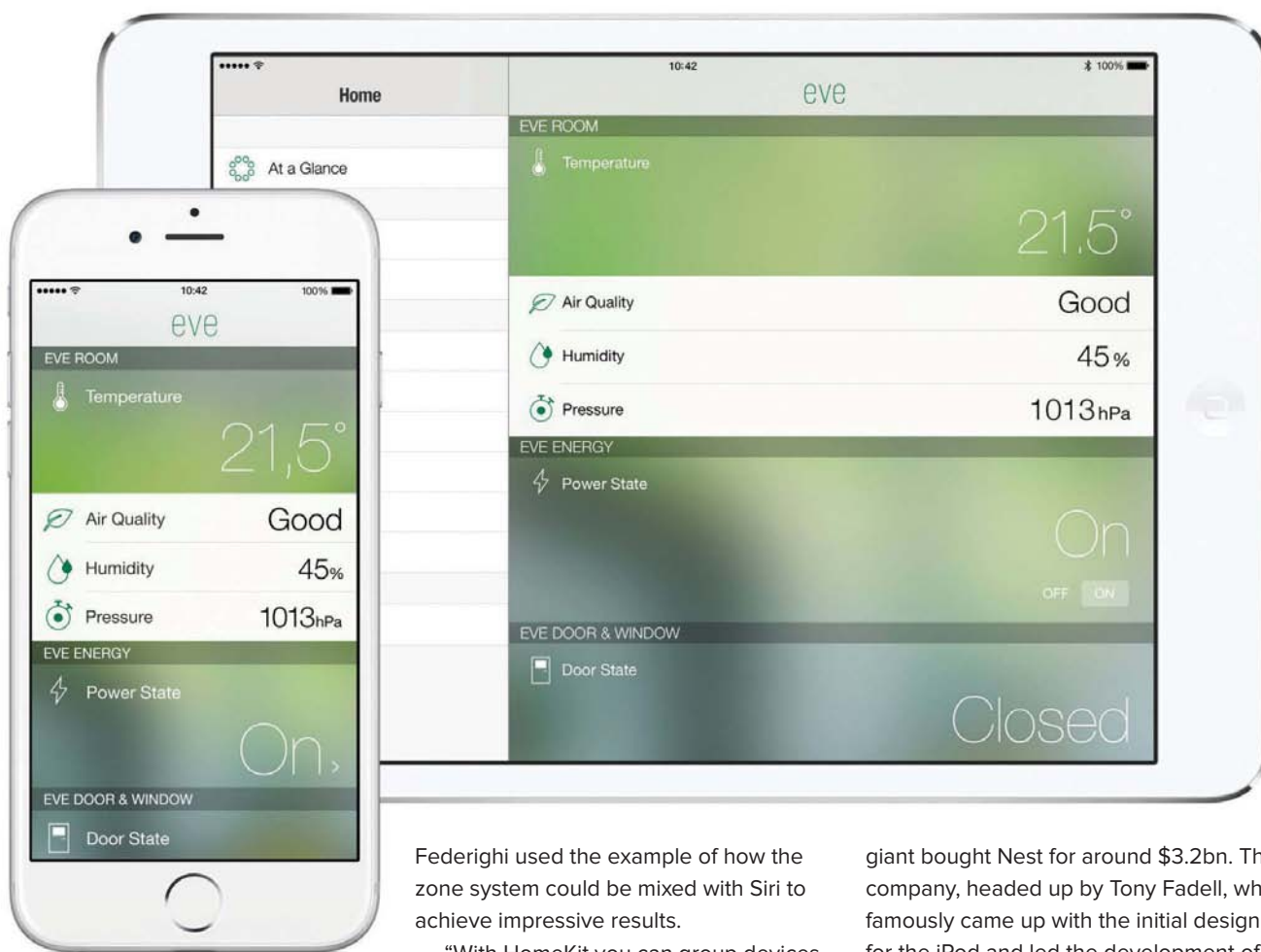
These chips will feature the HomeKit firmware, giving manufacturers a chance to test and finesse their devices before release to the public. In fact, Elgato has already announced HomeKit-compatible home automation devices, with its new Eve range. These upcoming products will include sensors that measure energy and water consumption, room temperatures, air quality, and humidity.

Further evidence that HomeKit is about to become a reality was revealed at the Made for iPhone/iPad (MFi) Summit in Shenzhen, China in November 2014 when Apple confirmed to the attending accessory manufacturers that it would now accept plans for HomeKit-related products. This is something usually done in the latter stages of a product development cycle, and would be a strong indicator that Apple is finalising its plans for rolling out the platform.

So with the Wi-Fi and Bluetooth chips already in the hands of device makers, and Apple now ready to approve their creations, it seems our wait may be over.

## Compatible devices

As far as we know, Apple isn't about to launch its own smart home gadgets but will allow third parties to make HomeKit



**All about Eve** Elgato has already announced HomeKit-compatible home automation devices, with its new Eve range.

so the user need only open one app to control them all. This could be a generic setting for the whole home, say changing the thermostat to a certain temperature, which might be as simple as turning off the lights in the bedroom. There's also a feature that allows you to create zones, so in one command you could lock all of the doors on the ground floor. With this kind of control over a home there are obviously security concerns, which Apple addressed when it confirmed that HomeKit would include secure pairing, so only a specific iPhone could open your door or issue other commands.

### How HomeKit will work with Siri

Siri seems firmly integrated with HomeKit, allowing users to use simple commands to complete regular tasks. At WWDC, Craig

Federighi used the example of how the zone system could be mixed with Siri to achieve impressive results.

"With HomeKit you can group devices and changes into scenes," he explained, "and then with Siri integration you can say something like 'Get ready for bed' and be assured that your garage door is closed, your door is locked, the thermostat is lowered, and your lights are dimmed. That's HomeKit."

### HomeKit's advantages

Simplicity. Home automation is meant to make life easier, but if you have to juggle 10 different apps to get something done, then the chances are you'll be quicker if you do it manually. It will also bring a uniformity to the interface, so the user will know how it works straightaway, rather than having to learn a new layout each time they buy a device.

### Google Nearby

Apple won't have the playing field all to itself in home automation, as Google has already made significant investments in this area. At the start of 2014, the search

giant bought Nest for around \$3.2bn. This company, headed up by Tony Fadell, who famously came up with the initial design for the iPod and led the development of the iPhone, has garnered much praise for its thermostat, which can be controlled via your iPhone.

Rumours have also been circulating about Google Nearby, a service that lets devices communicate with each other based on proximity. While the potential for this is still unknown, we've already seen the Android feature that unlocks a Chromebook if it detects your phone nearby. This could possibly be extended to work with media systems so you can arrive home to your favourite music.

How it will match up to HomeKit is still unclear, as neither system has been fully released, but Google has been aggressive in its expansion into the areas of wearables, TV, and in-car systems recently, so it would seem likely that a fully fledged home automation platform will appear before too long. Then it will come down to which manufacturing partnerships the two companies can forge, with exclusives being all important.



# Safari in iOS 8

Ashleigh Allsopp reveals five tips to help you master the new features in iOS 8's Safari app

## 1. Recently closed tabs

One very handy new feature in iOS 8's Safari is the ability to quickly reopen recently closed tabs.

By tapping the tabs button at the bottom-right of your Safari window, and then tapping and holding the plus (+) symbol, you'll get a list of your recently closed tabs. Simply tap on the one you want to reopen to get it back.

## 2. Enhanced private browsing

Private Browsing is a bit different in iOS 8's Safari app. Now, rather than asking whether you want to close all pages or keep them, going to Private Browsing Mode (tap the Tabs icon and then *Private*) will open a new window for you to start a fresh in.

Private Browsing tabs have dark grey bars on the top and the bottom to help you identify when you're using the Private Browsing mode.

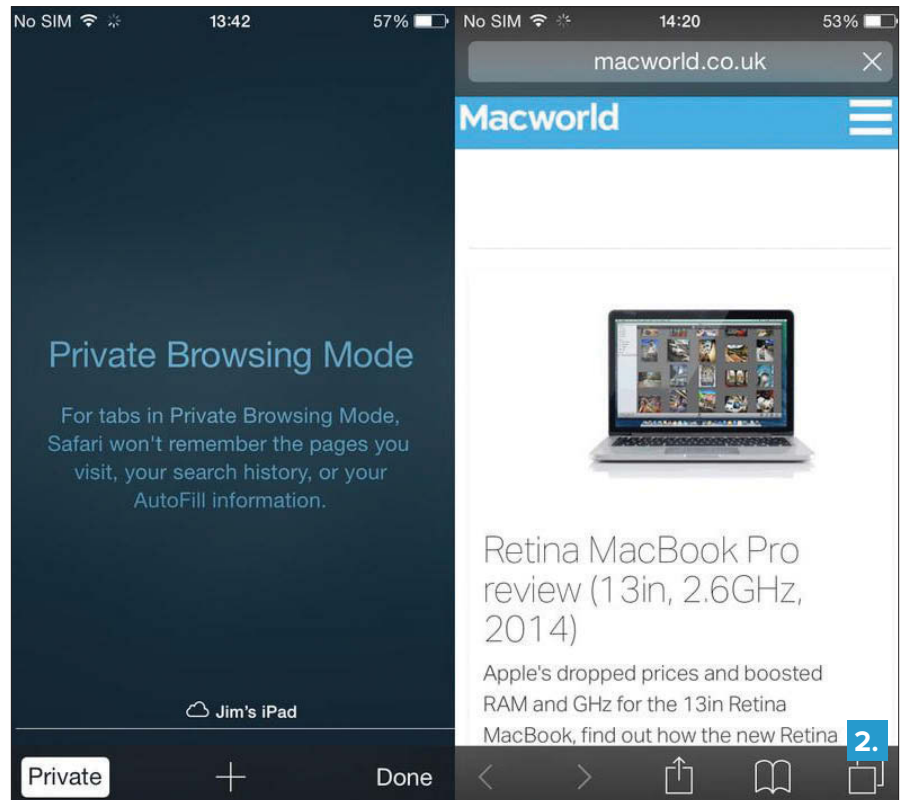
When you're done browsing privately (there are many reasons you might want to do so, as described here), tap *Private* again to be taken back to the Tabs window for your non-Private pages.

## 3. Private search with DuckDuckGo

Apple has added the ability to use DuckDuckGo as your search engine of choice in Safari to help those of you wishing to keep their data to themselves browse the web without being tracked. To change to DuckDuckGo, go to *Settings* → *Safari* → *Search Engine* and choose *DuckDuckGo* in iOS 8's Settings menu.

## 4. Get Safari to type your card number for you

We got a little bit excited about this feature. It's particularly great for internet shoppers. Now, if you're using Safari in iOS 8 and you need to type in your card details, you'll be able to tap a button on the keyboard that reads *Scan Credit Card*. You'll be asked to give Safari

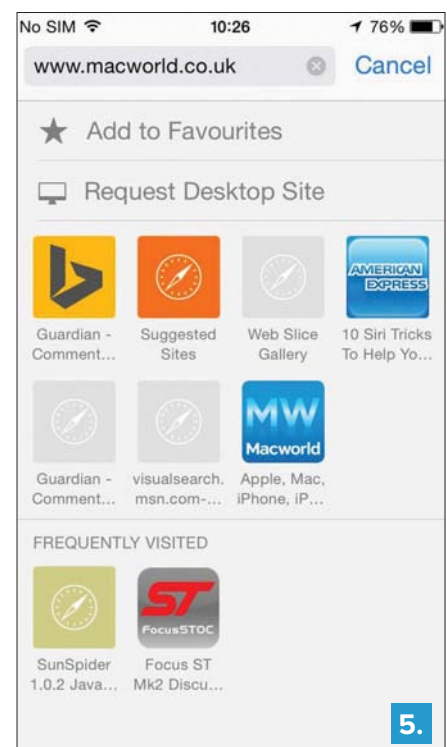


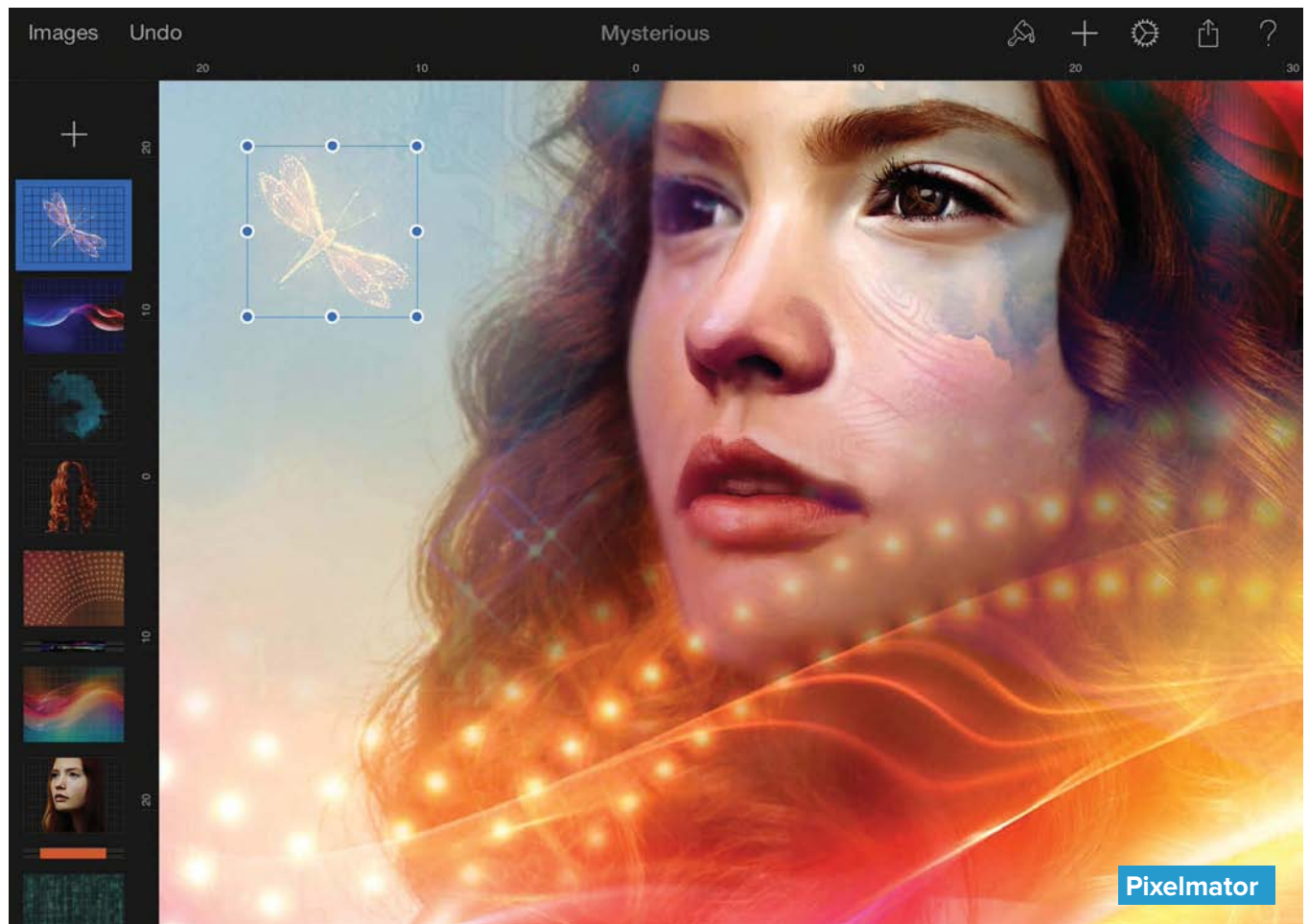
access to your camera, and then you'll need to position your card within the frame provided. After a second or two, Safari will read the number on your card and type it straight into the field within the web page. It's a huge time saver.

## 5. Request desktop site

Mobile sites should be great. They've been designed to make using them on your iPhone, iPod or iPad easier and more responsive. However, on some occasions, you may find that the mobile site of a particular website you're visiting is lacking a feature you know is present on the desktop site, or you might find it confusing to navigate.

In Safari in iOS 8, you can easily visit the desktop site of a website you're visiting by tapping on the URL bar and then swiping down to reveal the 'Request Desktop Site' option. Tap that to get to the desktop version of the website.





# Best apps for working on an iPad

Jason Cipriani reveals the iPad apps that can help boost your productivity

## Workflow

**£1.99, [tinyurl.com/kvykj4n](http://tinyurl.com/kvykj4n)**

A relatively new addition to our digital bag of tools is an app called Workflow. Think of it as the Mac's Automator feature, but for iOS devices.

The app makes it possible to automate mundane tasks such as annotating, then deleting screenshots in your Camera Roll, or more complex tasks such as converting a YouTube video to an MP3 – without you doing more than tapping a couple of buttons.

## Pythonista

**£4.99, [tinyurl.com/o83ukna](http://tinyurl.com/o83ukna)**

We also use Pythonista to automate parts of my daily work routine. Taking a

different approach than Workflow, Pythonista requires you to code actions in Python. We know next to nothing about programming in Python, but we've found the list of scripts in the app's forums to be more than sufficient to get started with. We get the most use out of Pythonista when it comes to creating consistent screenshot layouts for posts. Additionally, it cuts down the amount of time it takes me to process screenshots.

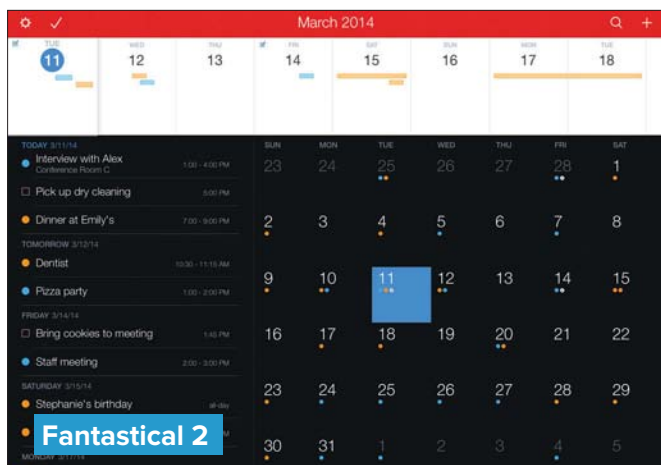


**With the amount of leaks and hacks surfacing seemingly daily, having strong and secure passwords is more important than ever**

## Pixelmator

**£7.99, [tinyurl.com/kpe5f43](http://tinyurl.com/kpe5f43)**

There was a time when editing photos on the iPad was mostly clunky and inconvenient. Then Pixelmator for iPad was released and the Apple's tablet became a legitimate photo-editing platform. Perhaps we're overselling it a little bit, but this app is easy to use, powerful and has near feature parity with its OS X counterpart. We just wish iCloud Drive played nicely with RAW image files.



## Editorial

**£4.99, [tinyurl.com/oux7byj](http://tinyurl.com/oux7byj)**

Editorial is the complete opposite of iA Writer, with buttons and information all over the screen. Editorial enables users to create workflows such as spell-checking text, Googling synonyms for a word, and finding and replacing text, just to name a few. It even offers a built-in browser for quick research, eliminating the need to leave the app. Think of it as a text editor on steroids.

## iA Writer

**£3.99, [tinyurl.com/p98yu52](http://tinyurl.com/p98yu52)**

iA Writer is our preferred writing app due to its Markdown integration and distraction-free writing interface. Best of all, it's not just for those who often stare down a blank screen with a blinking cursor. One of its lesser-known uses is creating and sending HTML-formatted email.

## Google Sheets and Google Docs

**Free, [tinyurl.com/mo7ob7n](http://tinyurl.com/mo7ob7n);**

**free, [tinyurl.com/nyjy3qd](http://tinyurl.com/nyjy3qd)**

Admittedly, the combination of Google Sheets and Google Docs is the best setup for sharing and working on the same document with people both inside and outside of your company. If you find yourself having to work with other people a lot, these two apps are a must.

## DocuSign

**Free, [tinyurl.com/ovzowwL](http://tinyurl.com/ovzowwL)**

Printing, signing, scanning and then emailing important documents can bring

a morning's productivity to a screeching halt. DocuSign's interface is a bit confusing at times, but overall it gets the job done. With a few swipes and taps we can place initials and signature on a document and send it back without ever leaving my desk. Not to mention, we get to do our part in saving the planet due to not having to print out lengthy contracts.

## Fantastical 2

**iPhone, £1.99, [tinyurl.com/o8vuqfm](http://tinyurl.com/o8vuqfm);**

**iPad, £3.99, [tinyurl.com/omqdejw](http://tinyurl.com/omqdejw)**

Fantastical makes entering an appointment or reminder painless with its ability to turn 'Lunch with John tomorrow' into a scheduled appointment. But our favourite feature is that it combines iOS

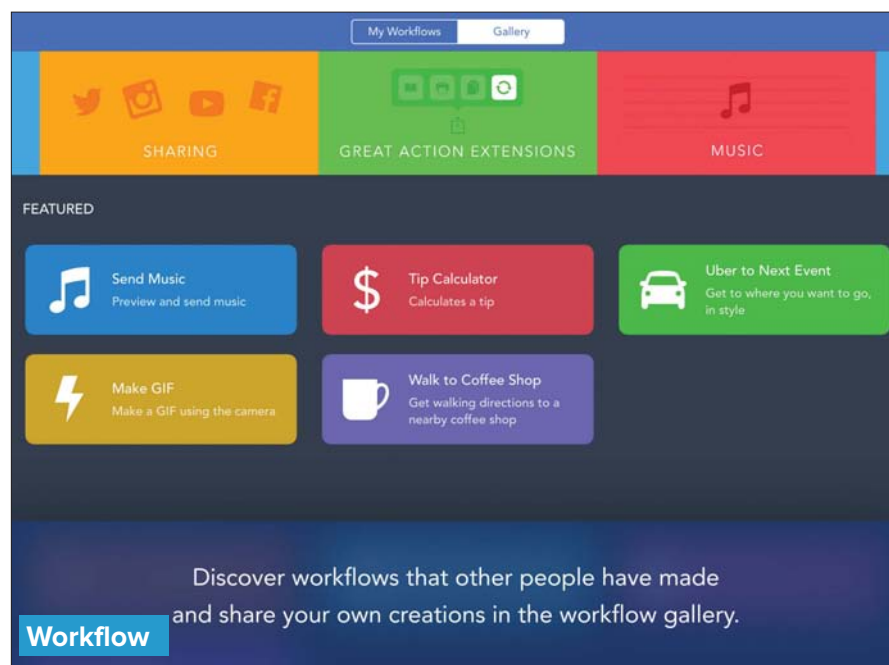


Reminders and your Calendar into one app, making it easy to manage both types of entries from the same place.

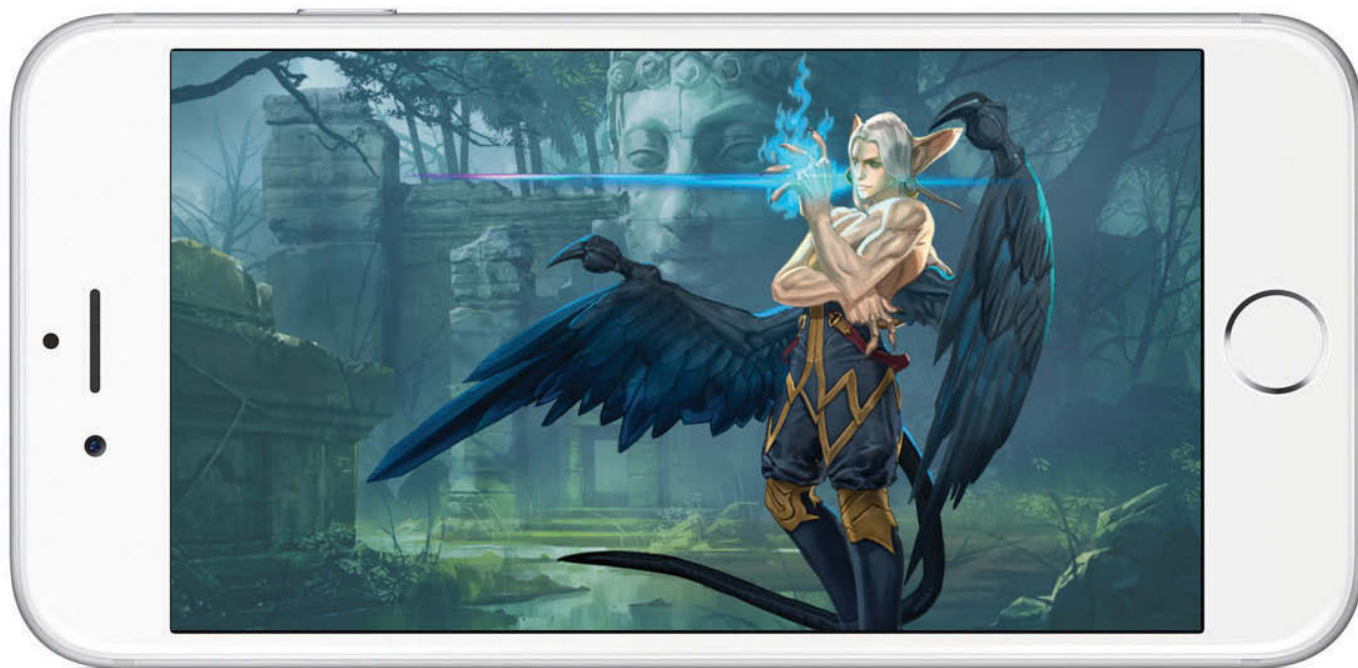
## 1Password

**Free, [tinyurl.com/mowvn9f](http://tinyurl.com/mowvn9f)**

With the amount of leaks and hacks surfacing seemingly daily, having strong passwords is more important than ever. 1Password is the app we use to create and manage my passwords. Our favourite feature of the app is its integration with iOS 8. Using extensions, we can access my vault directly within Safari on my iPhone or iPad and log into accounts without having to bounce around between apps. The Pro upgrade is £7.99 via in-app purchase.







# 14 BEST FREE iPHONE GAMES

BRILLIANT SMARTPHONE GAMING APPS  
THAT COST NOTHING

Looking for the best free iPhone games? We've rounded up 14 of our favourites

If you're keen on iPhone games but haven't got cash to spare, you've come to the right place. We've rounded up the 14 best free iPhone games for your delectation, running the gamut from fighting and sports games to puzzles and RPGs.

It's worth mentioning first of all, mind you, that free games aren't always the bargain they first appear – beware of

false economies, scam games, games crammed with annoying in-app payments and adverts, and various other irritations that often beset free games. We discuss some of these issues in 'Freemium is the worst thing in the history of gaming: a rant' and 'Why apps need to be more expensive'.

And if you're looking for games for kids, make sure they know about the

dangers and expenses of in-app purchases. We'd recommend the judicious use of parental controls to avoid an unpleasant and unexpected bill.

But that's enough scaremongering. There are some excellent free iPhone games out there if you know where to look. Let's get on to the games reviews: here are the 14 free iPhone games with which we're most impressed.

## 1. Vainglory

Vainglory offers some of the best visuals seen on the App Store. It was used as a showcase for the iPhone 6 handsets' power – not to mention the power of iOS 8's Metal graphics tech – when they were first unveiled. You should bear this in mind when considering what hardware to run it on: it's compatible with iPhone 5s and up on the smartphone side, although it goes back as far as iPad 2 on the tablet. The game spotlights three-on-three team-based action with (and against) fellow online players, and each squad must work together to take down enemy turrets and destroy the crystal at their opponents' base.

The free-to-play design thankfully puts no limits on gameplay: you can



play as much as you want, but only with the certain free characters offered at any given time. If you want to use a non-free warrior, you'll have to pay a

one-time fee with in-game currency. It's a remarkably fair and fun game that doesn't penalise players who opt not to shell out for extras.

## 2. Run Sackboy! Run!

Run, Sackboy! Run! is a mobile spin-off from the Sony game LittleBigPlanet, a four-player side-scrolling affair that builds upon the approachable Super Mario run-and-jump formula, while also allowing



players to build their own levels. It's certainly streamlined by comparison: it's a strictly single-player affair, lacks in-depth character customisation and level creation, and does away with manual player movement. In other words, it's an endless runner on a platform that has loads of them.

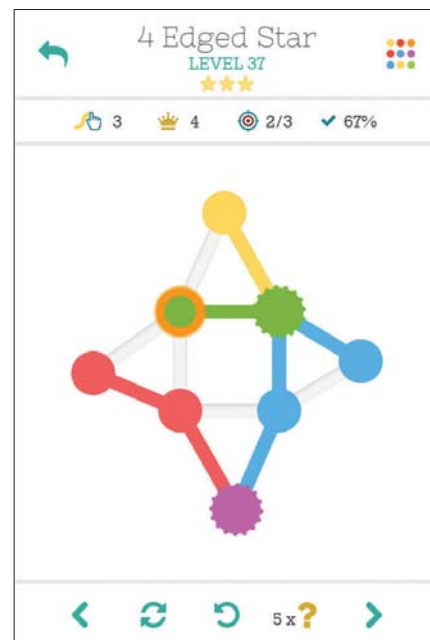
But Run, Sackboy! Run! has an ace in the hole: being ridiculously charming.

Even a simplified, free-to-play take on the LBP series can bring wide smiles to your face as you leap across colourful chasms, collect bubbles and avoid the goofy-looking monster on your tail.

And despite the silly tone, it actually proves to be pretty challenging. You can jump and dash forward via taps and swipes, respectively, and you'll need to use both at times to overcome long stretches of spikes, or to recover when you're about to hit an enemy.

As the speed picks up, it becomes harder to anticipate obstacles ahead, which amps up the difficulty level.

And it's free, of course. And so long as you're cool with probably never unlocking some of the pricier costumes – which cost an extravagant amount of in-game currency – there's plenty of entertainment to be had here without spending a penny.



## 3. Watercolors

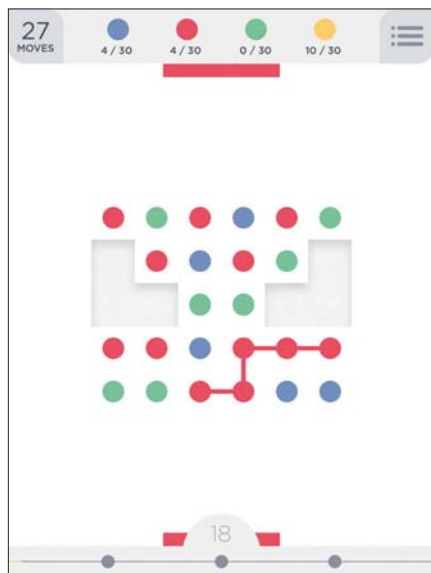
If simple, attractive puzzles are your thing, take a look at Watercolors. You have to swipe across various blobs of coloured 'paint', moving them around the level and mixing them with other colours where necessary. The idea is to colour all the nodes in the correct colour with the lowest number of 'brush strokes' possible.

It's a relaxing, neatly realised game and there's very little pressure to spend

money on additional level packs – although you may well choose to do so once you’ve completed the free offerings.

## 4. Two Dots

Two Dots, on the other hand, is a cunning one for encouraging real-money spending, and those with weak self-control should be wary.



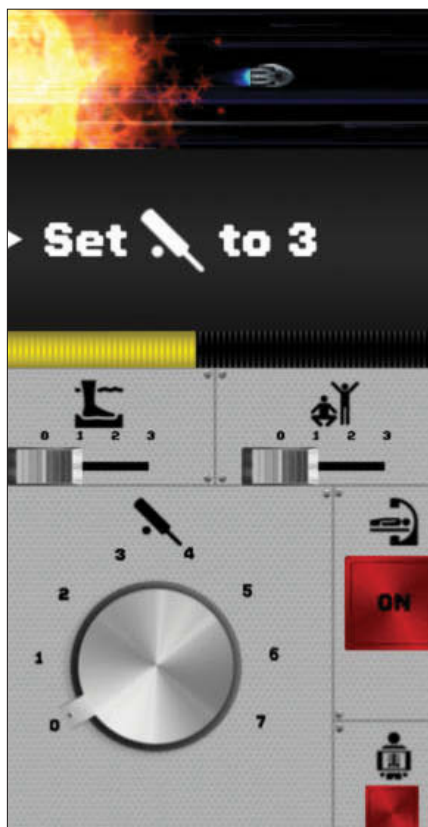
Like Watercolors, it asks you to trace lines between coloured dots, but in this case you’re making the linked dots disappear, Bejeweled-style. If you can’t clear the stipulated number of dots within the stated number of moves, you’ll lose a life, and the only way to get these back is to wait... or pay up.

## 5. Spaceteam

Glorious multiplayer fun, this – and the multiplayer part is essential. It’s one of the few iOS games out there that you cannot play on your own.

Each member of the team sees a wonky-looking sci-fi dashboard on their screen, with a variety of read-outs and bizarrely labelled dials, buttons and levers.

The screen will tell you to do something: “Set sprocket to 6”, to take a random example. If the sprocket dial is on your screen, all well and good; but most of the time, it’ll be on someone else’s, meaning you need to tell them what to do. In no time at all you’re all



shouting nonsense at each other, and the world is a wonderful place.

## 7. Temple Run 2

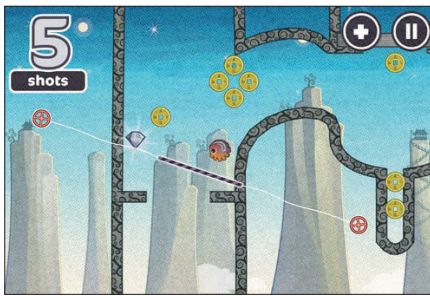
Temple Run 2 is an auto- or endless runner: your character, a fleeing Indiana Jones-alike, is propelled forwards towards a series of obstacles – fatal drops, spikey boulders, walls – and you have to swipe at the right moment and in the right direction to dodge them. Death is inevitable, as is having ‘just one more go.’



## 6. Only One

Talking of nonsense, why not give this slice of retro sword and sorcery a try? It’s a fantasy brawler, in which you (a sword-wielding maniac) have to defend a clifftop from all-comers, whether similarly armed warriors, archers, fireball-pumping wizards or coloured slimes. Bursting with personality, funny and so addictive that your iPhone screen will soon have a neat little sweat circle where the onscreen joystick appears.





## 8. Pangolin

A physics-based puzzler in which you bounce a cute little creature around a level and try to get him to the goal with as few shots as possible. Sort of like crazy golf played in mid-air with a scaly animal instead of a ball. We like this a lot, and the basic game is free. It's worth shelling out for the extra levels, though.



## 9. Letterpress

In this alarmingly addictive puzzle game, you and your opponent take turns to use the letters in a five-by-five grid to build a word, thereby causing the tiles you use to change into your colour. At the end of the game, whichever player has turned more tiles to his or her colour emerges the victor. Serious fun for word game fans.



## 10. Bejeweled Blitz

This ultra-moreish puzzle game takes the 'match three' mechanic and squashes it into minute-long blasts of dazzling colours and crazy point tallies. Be warned: it's astonishingly addictive.

You have to swap coloured jewels within a grid, using finger swipes, so that three or more line up; the matched jewels will disappear and more will replace them. The tense gameplay, drip-feed of rewards and social-media integration combine to make a game that will expand to fill any time period available.

## 11. Tiny Heroes

In this appealing fantasy-themed take on the tower defence game, you take the role of a mad architect who sets out to shred and perforate any would-be adventurer who dares to loot his dungeon's precious treasures. Waves of cartoonish heroes wander in, then meet a swift end by spinning blade, concealed spike or caged monster. You'll have to plan for several kinds of heroes, from



tough knights to crafty thieves, and balance between planning ahead and spontaneous fire-fighting.

## 12. New Star Soccer

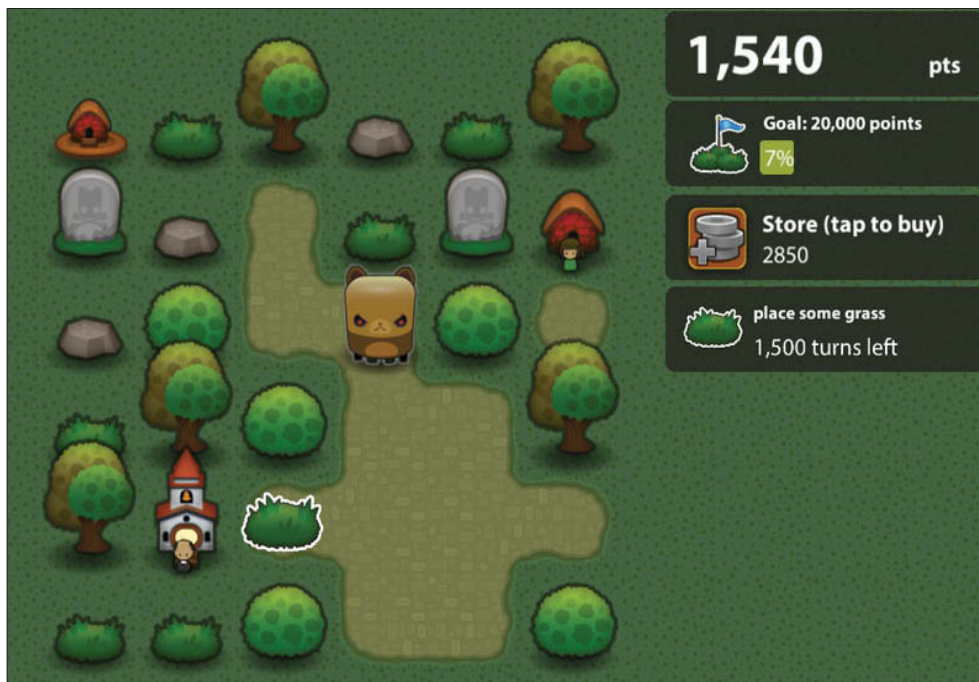
It's a testament to the brilliant gameplay that even football haters will get something out of this.

You're a striker starting out in non-league football and aiming for the big time. On the pitch, you're tasked with setting up and scoring wonder goals. But the game also deals with non-match activities: training, selecting clothes and kitting out your house in a load of tat.



### 13. Jetpack Joyride

In this delightful cave flyer, your disgruntled lab-assistant character steals a machine-gun-powered jetpack (don't ask) and takes flight through the lab's never-ending string of long, tunnel-like rooms. As you jet or run along, you need to avoid electrified barriers, lasers and missiles while collecting coins. The mix of responsiveness and acceleration is just about perfect, the comical graphics raise it above most offerings in the genre, and the extras – including a superb array of vehicles – make Jetpack Joyride a true standout.



### 14. Triple Town

Triple Town is a 'match three' game with a look and feel all its own. You're building a town on a grid filled with bushes and trees. Grouping items into threes makes them transform: three trees become a hut, three huts become a house, and so on. There are even enemies (bears), although these are rather adorable. They wander about, getting in the way, but if you trap them into a single square they, um, die, turning into grave stones. Inevitably, you can match three of these, making a church.

The whole thing is fresh, addictive and challenging.



# Why the iPad isn't doomed

Despite all the naysayers Ted Landau believes the iPad still has a lot of life in it

Over the past few years, the iPad has steadily expanded into domains traditionally dominated by laptops. It's now the primary or only computing device for a significant segment of the mobile market. More and more, people on the go are leaving their laptops at home, taking only their iPads.

With increasingly sophisticated iOS apps, such as GarageBand and the Microsoft Office suite, iPads have also been shedding their reputation as 'consumption-only' devices and staking a claim as a productivity tool. Indeed, they are finding their way into a wide variety of settings – from schools and hospitals, to art studios and science labs.

The iPad mini has been an especially bright star. The original 2012 model took off strongly right out of the starting gate. It was well-timed to counter the growing popularity of smaller-sized Android tablets. But it was the 2013 option with

Retina display that really soared. iPads, especially the mini, were on a roll and were expected to continue growing in sales and market share.

Fast forward a year and how the landscape has changed. According to reports, there has been an overall decline in tablet sales of all brands. Most notably for Apple, the iPad experienced its first year-over-year decline.

## What happened?

There's a growing sense that the 'post-PC' tablet may have been oversold. Despite all the wonderful things you can do with an iPad, there are still occasions when you'll need a keyboard and trackpad, a larger display, and all the other advantages of a computer.

The current decline in tablet sales may also be attributed to an upgrade cycle that is longer than initially predicted. Rather than getting a new tablet every two years – as is common with phones – people are hanging on to their iPads for at least three- or four years.

The iPad mini is seen as the biggest victim of this negative trend. Why?

Because, on top of all the aforementioned factors, there's the iPhone 6 Plus. Before the arrival of Apple's phablet, many otherwise happy iPad mini owners grumbled about having to carry around two devices when on the go – their iPad mini and their iPhone. Many of these same users now claim that the 5.5in iPhone 6 Plus is large enough that they can abandon their mini.

Some have even gone so far as to predict that the iPad mini is doomed – they expect Apple to drop the smaller tablet from its line-up in another year or two. As a portent, they point to Apple's decision to not update the mini this year (except for the addition of touch ID) – in contrast to the significant update of the iPad Air 2.

Let's not get carried away. First off, no matter what the future holds for iPad sales, I don't see Apple acting that rashly or hurriedly. After all, it took until 2014 before Apple dropped the iPod Classic. The iPod touch continues to be available, despite apparent languishing sales. I don't see the iPad mini disappearing at a faster rate. In fact, I don't see the mini disappearing at all. Although its share of the market may decline, it will remain in the mix of available iPad options and continue to do more than well enough to justify its existence.

## Bottom line

So where do we go from here? I see two trends emerging. First, there will be an increasing split among smaller and larger iOS tablet devices. The iPad mini and the iPhone Plus will be the options for those preferring a smaller device – while the iPad Air and presumably an iPad Pro/Plus will be the choices for those who find greater value in a larger size tablet.

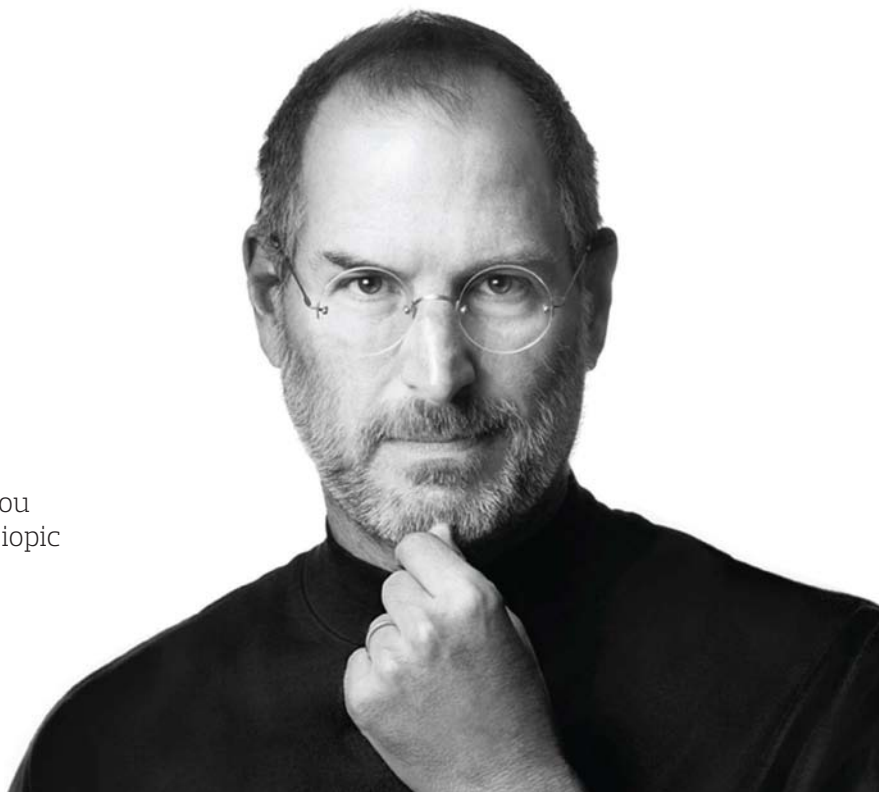
Secondly, there will be a rebalancing of the mobile computing market. Those who predicted that tablets would eradicate laptops, or that mini-sized tablets would eradicate larger ones, were hasty in their judgments. Instead, as users become more familiar with the pros and cons of each category, a significant number of tablet users are gravitating back to a laptop. Tablet sales may continue to decline for a period of time. However, once the market stabilises, I expect tablet sales to start a slower but significant upward trajectory again.





# Steve Jobs: the movie

Karen Haslam reveals everything you need to know about the upcoming biopic



## 1. Danny Boyle is the director of the new Steve Jobs movie

We really couldn't ask for a better director. Danny Boyle has a great portfolio of work: *Slumdog Millionaire*, *Shallow Grave*, *28 Days Later* and *Trainspotting*. Not to mention he directed the spectacular 2012 London Summer Olympic Games Ceremony.

## 2. Writer Aaron Sorkin created *The Social Network*, *A Few Good Men* and *The West Wing*

Aaron Sorkin wrote *The Social Network*, which was everything that 2013's *Jobs* movie wasn't. Sorkin wrote a tight story about the founding of Facebook and the tension Zuckerberg's success caused among his friends at university. The film is a haunting, chilling and tense movie about friendship, power and success. Sorkin's past credits also include *A Few Good Men* and *The West Wing*.

## 3. The movie is based upon Walter Isaacson's biography

Walter Isaacson's authorised biography is a great read and he's credited as a co-writer, although how much actual writing he is doing is unclear and we assume it is just a credit. The important thing is that it could balance against the creative nature of Sorkin to ensure a movie that is gripping, while staying true to its source.

## 4. The film also includes insight from Jobs' daughter Lisa Brennan-Jobs

In a departure from the Walter Isaacson biography, Steve Jobs' daughter Lisa is to play a big part in the Steve Jobs movie. Lisa Brennan-Jobs, was estranged from her father for part of her childhood as he refused to acknowledge that she was his, although she later went on to live with his family. She didn't participate in the Steve Jobs biography because her father was alive at the time and she didn't wish to cause a rift in her family, but she is now working with Aaron Sorkin on the screenplay for the Steve Jobs movie.

## 5. Michael Fassbender is to play Steve Jobs

Perhaps best known for his role of Erik Lehnsherr/Magneto from *X-Men*, Michael Fassbender looks like a good choice to

play the charismatic Jobs. He has a good portfolio of roles in movies, including *12 Years A Slave*, *Inglorious Basterds*, *Prometheus* and *Frank*.

## 6. Christian Bale pulled out of playing Steve Jobs

Christian Bale, most famous for playing Bruce Wayne/Batman in *The Dark Knight* films struck everybody as a good choice for playing the charismatic entrepreneur. He left the project, citing "conflicting feelings". It's been reported that he thought he was not right for the role.

## 7. Leonardo DiCaprio was also lined up to play Steve Jobs

*The Wolf of Wall Street* star is another big name that was linked with the title role, having previously worked with Danny Boyle on *The Beach*. It's thought he quit the movie due to a scheduling conflict.

Walter Isaacson's authorised biography is a great read and he's credited as a co-writer, although how much actual writing he is doing is unclear



**8. Seth Rogen to play Woz**  
Seth Rogen is set to play Steve 'Woz' Wozniak. Rogen is an interesting choice as he is a comedian, with roles in films such as *The Interview*.

**9. Kate Winslet set to play Joanna Hoffman**  
Kate Winslet has confirmed she is to play Joanna Hoffman, one of the original members of the Macintosh and NeXT teams.

**10. Katherine Waterston cast as Chrisann Brennan**  
Katherine Waterston is due to play Chrisann Brennan, the mother of Lisa.

**11. Jeff Daniels to play Sculley**  
Jeff Daniels, who worked with

Sorkin on *The Newsroom* has taken the role of former Apple CEO John Sculley.

**12. Michael Stuhlbarg takes on role of Andy Hertzfeld**  
*Boardwalk Empire*'s Michael Stuhlbarg is said to be set to play father of the Macintosh, Andy Hertzfeld.

**13. The film was going to be made by Sony, but Universal has taken the reins**  
Reports suggest that Sony didn't drop out because of the way the iPod

Perhaps best known for his role of Erik Lehnsherr / Magneto from *X-Men*, Michael Fassbender looks like a good choice to play the charismatic Jobs

flattened the Walkman, instead, it was other commitments. Sony bought the rights to Walter Isaacson's biography of Steve Jobs in 2011.

**14. The new Steve Jobs movie has a three-part script**

The script is believed to be divided into three acts following Jobs' preparation for three Apple product launches spanning 16 years. It's also said to feature Sorkin's trademark fast-paced dialogue, with each act set as Jobs' prepares for a major product launch.

**15. The script is top secret**  
Speaking of the script, it's been reported that those auditioning for parts didn't get to see the script. It's so secret that they are reading scenes from Sorkin's *Newsroom* series.

**16. The movie is based around the Mac, NeXT Computer and the iPod, but not the iPhone**

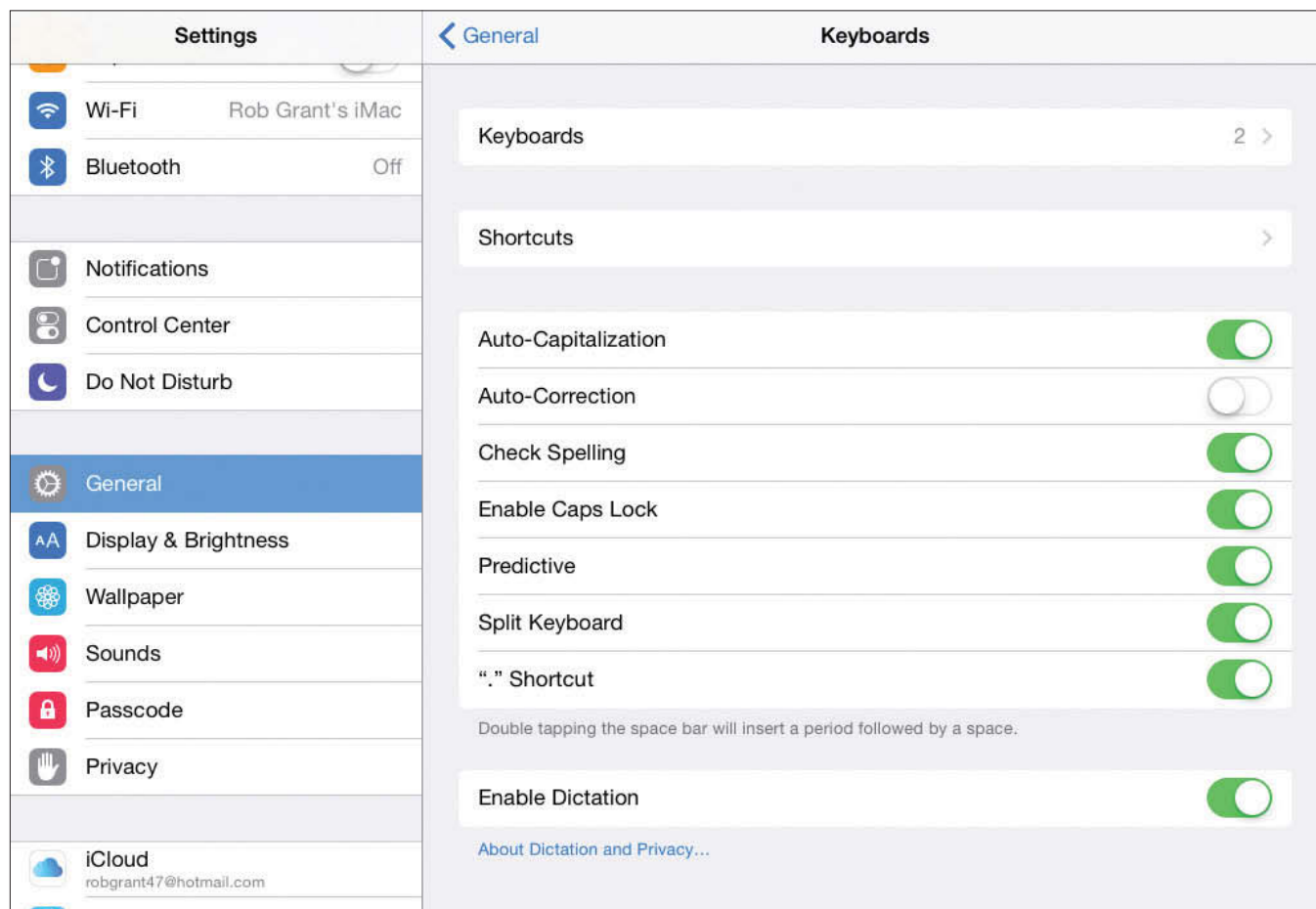
The three acts mentioned above cover the launches of the original Macintosh, NeXT Computer and the iPod. While many Apple fans might wonder why more recent products, such as the iPhone and iPad aren't included these three products define an important arc of Jobs' relationship with Apple.

**17. Shooting for Steve Jobs was set for winter 2014, but is likely to start in spring 2015**

The film was due to start shooting late last year, but the changes at the helm, and the fact that Fassbender's involvement was only confirmed at the end of November, it is now likely to be delayed. We expect filming to start early in 2015.

**18. The film should be released in late 2016**

But we won't be holding our breath.



# Turn off Autocorrect

If you've had enough of Autocorrect, Lou Hattersley reveals how to turn it off

**A**utocorrect is a text correction feature found in iOS and Mac OS X. With it enabled you can type quickly, and if you misspell a word it'll be changed to the correct one.

At least that's the theory. In fact, messages sent in Autocorrect often contain the wrong word, as it kicks in and changes a badly spelt word to a correctly spelled (but totally different) one. Often this results in hilarious messages, to the point where people share the results of autocorrect-ruined messages: these incidents are popularly known by the phrase: "Damn you Autocorrect!"

While the feature can be useful and convenient, it's worth seeing if you get on better without it. Turning off Autocorrect

ensures that you send the message you mean. You'll find Auto-Correction features in Settings in iOS, and an option to Correct Spelling Automatically in OS X. Both of these can be turned off if you want to regain control of your spelling.

In this feature we look at how to turn off Autocorrect in iOS and OS X.

## Turn off Autocorrect in iOS

If you've decided that you no longer want Autocorrect to be a part of your iPad/iPhone experience, then you can head into settings to turn it off. Follow these steps to turn off Autocorrect:

- Tap *Settings* → *General* → *Keyboards*
- Set the Auto-Correction setting to Off.

Note that Auto-Correction is separate to the Predictive text feature. The

Predictive setting relates to the three word options that appear above the keyboard as you type.

## Turn off Autocorrect in OS X

While it's not such a problem in OS X (because typing on a keyboard is generally more accurate), if you've decided that you no longer want it in OS X, follow these steps:

- Open System Preferences (choose *Apple* → *System Preferences*).
- Choose *Keyboards*, click the *Text* tab, then deselect the tick in *Correct Spelling Automatically*.

Now when you type in OS X, you won't find words corrected automatically. With Autocorrect turned off, you will be able to spell words however you want.



# Let's get metaphysical

There's more to the collection of metadata than meets the eye

**N**aturally, computers are really good at data – collecting it, storing it, processing it. And by the same token they are also great at working with metadata. This is not the real content, but all the labelling attached to the data.

Increasingly every file is tagged with even more data about the data, such as exposure settings and geographical location automatically embedded into all the photos we snap with our phones. The more accurately we can describe each document, spreadsheet, photo, song and video file, the easier it becomes to find.

The subject of metadata has been raked over again in the wake of the Snowden revelations, making metadata another buzzword paraded through the news. Our governments routinely claim they are unable to look into our data – the actual content of our emails, for instance – since these are legally protected by laws and constitutions.

Let's ignore the facts now laid out before us which show that GCHQ does indeed record the entire content of every single email and every fixed-line and mobile phone call that we make today. And instead turn to the amazing utility of our metadata, which the surveillance agencies are more ready to publicly concede they routinely tap and archive.

The problem is that even without knowing the content of communications, metadata creates a telling story of who we are, with whom we communicate and what we might be saying. Given a suitable slice of metadata, an adversary can build a detailed picture of all aspects of our lives.

The British government passed the Regulation of Investigatory Powers Act in 2000 to legitimise the mass surveillance of communications in transit, ostensibly in the interests of national security. A



**Given a suitable slice of metadata, an adversary can build a detailed picture of all aspects of our lives**

significant part of the newly legislated dragnet will include every British citizen's communications metadata.

But requests are routinely made through RIPA for reasons far removed from the act's original stated purpose of safeguarding us from terrorism, organised crime and paedophiles. There are now stories of local authorities hiding behind RIPA to direct surveillance at individuals suspected of mundane civil offences such as dog fouling.

More troubling is the use of metadata harvested for the government that has been exploited to undermine press freedom – notably to reveal journalists' sources. The Metropolitan Police was caught bypassing necessary court orders when it requisitioned and sifted through the phone records of daily newspaper editors in two recent high-profile cases.

The policemen who were found guilty of falsifying evidence in the Plebgate

case had secretly obtained phone records (metadata) with a RIPA request to uncover the embarrassing leak. And in the Chris Huhne speeding trial, a confidential source was exposed through the covert requisition of a newspaper editor's mobile phone records. In these cases, it was not the content of the calls that was turned against the journalists and their source, but simply the metadata records that showed the who, where and when of key phone calls.

In November I was invited to the Open Rights Group Convention at Kings College London, by sponsor AAISP. There I heard about the most disturbing application of metadata so far, for the targeted assassination of suspected militants in Pakistan, Yemen and Somalia.

The truth is now unravelling, that drone strikes have been ordered on the basis of intelligence metadata that has condemned targets without trial.

In case there is any doubt about the power invested in metadata, and its usefulness to the surveillance authorities, we need only turn to the spokesmen for the spooks. Starting with former general counsel of the NSA Stewart Baker, who said 'metadata tells you everything about somebody's life. If you have enough metadata, you don't need content'.

But the last word goes to General Michael Hayden, former head of the NSA from 1999 to 2005, and director of the CIA from 2006 to 2009. Speaking at a symposium at John Hopkins University in April last year, Hayden concurred that you can learn all about someone from their metadata trail. He followed with the simple, chilling admission: 'We kill people based on metadata'.

Remember that when politicians such as Barack Obama assure you 'that's all we're collecting, just the metadata, so you shouldn't need to worry about it'.

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# Buyers' Guide

## Mac Pro

UPDATED  
19/12/13

Apple's late 2013 Mac Pro has been completely redesigned inside and out. The new model has a cylindrical case, and the entire top acts as a carrying handle. That's possible because the new version is about one-eighth of the size of the previous Mac Pro tower, and stands at 9.9in tall. The new design is built around a 'unified thermal core' that aims to keep the Mac Pro cool.

Under the hood, there's an Intel Xeon E5 processor. It can have up to 12 cores, and offers double the CPU performance of the current Mac Pro. It uses a third-generation PCI Express architecture, and 1866MHz ECC DDR3 RAM. When it comes to graphics, the new Mac Pro has dual AMD FirePro workstation-class GPUs, and can run three 4K displays. It's up to two-and-a-half times faster than its predecessor, and delivers seven teraflops of computer power.

Apple is outfitting the new Mac Pro with PCIe-based flash memory, which is 10 times faster than traditional desktop hard drives. It has four USB 3.0 ports, six Thunderbolt 2 sockets, gigabit ethernet and HDMI.



**Price:** From £2,499

**Pros:** PCIe flash memory; six Thunderbolt 2 ports

**Cons:** No internal expansion options

**Macworld preview:** [tinyurl.com/prj4vp9](http://tinyurl.com/prj4vp9)

## MacBook Pro

UPDATED  
11/06/12

Apple removed the 15in model from its non-Retina MacBook Pro range, so only a 13in version is available. Apart from this nothing has changed – it has the same unibody design, upgradability and price, and it remains the only MacBook to have an optical drive. On the inside, there's an Intel Core i5 Ivy Bridge processor, 4GB RAM and a 500GB, 5400rpm hard drive. Connectivity options include USB 3.0, Thunderbolt, FireWire and ethernet. While these specs aren't as impressive as Apple's other MacBooks they are still more than enough for the non-creative professional or the home user. If you want to future-proof your computer, then a number of configuration options are available at the point of purchase, including a 2.9GHz Intel Core i7 processor, 8GB RAM and a 1TB hard drive. Plus, it will run OS X Mavericks, and any other Mac software you may already have.



**Price:** £899

**Pros:** USB 3.0; Intel Core i7 Ivy Bridge processors; nVidia graphics; Thunderbolt

**Cons:** No 15in model available; no Retina display

**Full review:** [tinyurl.com/nsbusw4](http://tinyurl.com/nsbusw4)

## iMac

UPDATED  
17/10/14

Apple has added a Retina display iMac to its range of all-in-one computers. Only the 27in model gains this – the 21in version doesn't get a hi-res screen. If, however, you don't want the extra expense of a non-Retina 27in option is still available.

All the iMacs come with Intel's fourth-generation Haswell processor. The benefits of this for desktop computers are not as profound as for laptops, as a big factor is lower power consumption, and therefore better battery life. But, Haswell could mean you'll save on your electricity bill, and it will help your machine stay quieter and cooler.

The iMac retains the slimline aluminium design of its predecessor along with the beautiful-looking display. build-to-order options is the Fusion Drive – a hybrid storage device combining flash storage with a regular hard drive.



**Price:** 21.5in £899 to £1,199; 27in £1,449 to £1,599; Retina 5K display, £1,999

**Pros:** Retina display option, thin design; updated processor; improved graphics

**Cons:** No optical drive or FireWire 800 ports

**Full review:** Retina display, [tinyurl.com/qhb5rs8](http://tinyurl.com/qhb5rs8); [tinyurl.com/pfu6xox](http://tinyurl.com/pfu6xox)

## MacBook Air

UPDATED  
29/04/14

This year's MacBook Air line-up isn't all that different to last year's model, apart from a substantial price decrease. As previously, the 2014 options are available in four standard configurations: two with 11.6in screens and two with 13.3in screens. The new prices place the entry-level 128GB 11in MacBook Air at £749, down £100 from £849. Pricing changes aside, there's a subtle increase in processor speeds for the new machines. All four configurations have the same Intel 1.4GHz dual-core Core i5 processor, which is 100MHz faster than the 1.3GHz dual-core Core i5 processor found in the mid-2013 Air. Everything else is the same as last year's model: 4GB of DDR3 memory, Intel HD 5000 integrated graphics, and either 128- or 256GB of PCIe-connected flash storage. The 11.6- and 13.3in displays keep the same resolutions, 1366x768 and 1440x900, respectively – the new

Air doesn't include a Retina display like some analysts had predicted. We were disappointed that the new Airs didn't perform as well in our speed tests as last year's models, although in many tests the newer models outperformed the 2013 versions.



**Price:** 11in £749 to £899; 13in £849 to £999

**Pros:** Stylish; super-slim; great battery life; price has been reduced

**Cons:** Still no Retina display

**Full review:** [tinyurl.com/Ldxfyks](http://tinyurl.com/Ldxfyks)

## MacBook Pro Retina display UPDATED 29/07/14

Apple has upgraded its MacBook Pro with Retina display line-up. The 13- and 15in models have been given a small speed bump and their prices cut. It seems likely that Apple has made these slight tweaks to the range predominantly to allow it to bring down pricing, but also because Intel's Broadwell processors – the successor to the Haswell chips used in these Macs and the generation before them – aren't yet available. The screen itself hasn't been upgraded, but it's still stunning: the 15in version offers a resolution of 2880x1800 pixels; while the 13in option has an equally striking 2560x1600 pixels. Connectivity options are just as impressive and include 2x Thunderbolt 2, 2x USB 3.0 and 1x HDMI ports. The MacBook Pros in this line-up also have the same dimensions and weigh the same as the late 2013 line-up, making it a great portable option.



**Price:** 13in £999 to £1,399; 15in £1,599 to £1,999

**Pros:** Stunning Retina display; USB 3.0; thin design; Haswell processors

**Cons:** No optical drive; expensive; small storage options

**Full review:** 13in, [tinyurl.com/LctLqL8](http://tinyurl.com/LctLqL8); 15in, [tinyurl.com/pugvnuf](http://tinyurl.com/pugvnuf)

## iPad mini 3 UPDATED 17/10/14

The most obvious new addition to the iPad mini 3 is Touch ID, which will allow you to unlock the device, and to open compatible apps. Apple has also introduced a gold version to the range. That, however, is it as far as new features are concerned. This isn't to say this isn't a great little tablet. It still has a gorgeous-looking Retina display, which offers 326ppi and its diminutive size means it will easily fit into a bag. To power this tablet, Apple has decided to use the same A7 chip as the iPad mini 2 and not the A8X found on the Air 2. The battery life is also the same as its predecessor – 10 hours.



**Price:** Wi-Fi £319 to £479; Wi-Fi + 4G £419 to £579

**Pros:** Touch ID; Retina display

**Cons:** Little to make it stand out from its predecessors

**Full review:** [tinyurl.com/LgLq54t](http://tinyurl.com/LgLq54t)

## Mac mini UPDATED 17/10/14

Externally, the Mac mini is more or less unchanged from its previous incarnation, save for the introduction of Thunderbolt 2 ports and the loss of FireWire. It's 19.7cm square and 3.6cm deep, which is where it earns its 'mini' name. The entry-level model has a 1.4GHz dual-core i5 chip and 500GB hard drive, while the mid-range option comes with a 2.6GHz dual-core Intel Core i5 chip and a 1TB hard drive. The top model has a 2.8GHz dual-core Intel Core i5 processor and 1TB Fusion Drive. Every model is configurable should you want to boost the specs of your Mac mini. Among the £799 model's build-to-order options are a 1TB SSD, a 3GHz dual-core Intel Core i7 chip and 16GB of RAM. You should note that while this is Apple's most affordable system, you'll need to factor in the cost of a monitor, keyboard and mouse.



**Price:** £399 to £799

**Pros:** Thunderbolt 2; small size; 1TB Fusion Drive on top model

**Cons:** Doesn't come with a monitor, keyboard or mouse

**Full review:** [tinyurl.com/k7c4akh](http://tinyurl.com/k7c4akh)

## iPad Air 2 UPDATED 17/10/14

Apple has updated its iPad range, and this time around the company has continued its mantra that slimmer is better – it now measures just 6.1mm wide. It's also lighter than its predecessor – 437g compared to 469g. However, despite its low weight and slimline design, it still feels solid. The big addition is the introduction of Touch ID, which you'll be able to use to unlock the tablet, and to open various apps. The slimline tablet also comes with a new chip – the A8X. This offers a 64-bit architecture and three billion transistors and, according to Apple, is 40 percent faster than the original iPad Air. Another benefit of this processor is that it uses quad-core graphics, something that game developers will be keen to utilise.



**Price:** Wi-Fi £399 to £559; Wi-Fi + 4G £499 to £659

**Pros:** Touch ID; A8X chip; slimmer than ever; beautiful screen

**Cons:** If you already own an iPad there's not enough here to warrant an upgrade

**Full review:** [tinyurl.com/mg9t2cx](http://tinyurl.com/mg9t2cx)

## Buyers' Guide

### iPhone 6

UPDATED  
19/09/14

It's clear that the most important change with the iPhone 6 is its size. Yes, the processor is a bit faster and the camera is slightly improved, but it's the 4.7in display that makes the biggest difference. It means a better experience when watching TV shows or movies on your iPhone, it displays photos better, and it allows more information to be shown on the screen at once. In terms of connectivity, the iPhone 6 has better LTE capabilities, and it also has NFC for the first time, which will work together with the company's new Apple Pay mobile payment service. This won't be introduced to the UK until sometime in 2015, though. If you've got an iPhone 5 or older, then the 6 is a solid upgrade that you'll get used to after just a few days of adjustment, but 5s owners might want to consider waiting another year for the iPhone 6s as they've already got a brilliant smartphone and aside from that bigger display the iPhone 6 doesn't bring many other new features to the table.



**Price:** 16GB £539; 64GB £619; 128GB £699

**Pros:** New design more comfortable to hold; improved screen

**Cons:** Requires inconsistent 'Reachability' tool for one-handed use

**Full review:** [tinyurl.com/k2e](http://tinyurl.com/k2e)

### iPhone 6 Plus

UPDATED  
19/09/14

iPhone 6 Plus is a stunning piece of design, and its sumptuous 5.5in screen will be a magnificent showpiece for the latest games, movies and web pages. It's also available in capacities up to 128GB, which is great if you want to store lots of programmes and films on your device. The 64-bit A8 chip will improve performance. Whether the clever Reachability feature will be enough to solve the problems of such a large smartphone remain to be seen, however, and the price tag remains intimidating. The iPhone 6 Plus is a huge leap from the iPhone 5s, not in terms of technology so much as in terms of its physical presence. It won't be for everyone, but we are sure that it will pick up many advocates for whom the bigger screen is ideal.



**Price:** 16GB £619; 32GB £699; 128GB £789

**Pros:** Great-looking screen; beautiful design;

**Cons:** Expensive; rear camera sticks out a little;

**Full review:** [tinyurl.com/kn36zee](http://tinyurl.com/kn36zee)

### iPhone 5c

UPDATED  
20/09/13

The 5c is the cheapest of Apple's iPhone models. As our *Macworld US* colleagues put it, the 5c "looks a bit like the iPhone 5 had a baby with the plastic-backed iPhone 3GS". This is the first time Apple's handset has been available in anything other than black and white – it's available in pink, yellow, blue, green or white. It's constructed from a polycarbonate shell, crafted from a single piece of plastic, and feels good to hold and well built without being heavy. On the inside is a A6



chip, the same processor as the iPhone 5. If you are thinking of buying a 5c, you should note that since Apple updated its iPhone range, this handset is available only with 8GB of storage, which may not be enough if you have lots of apps.

**Price:** 8GB £319

**Pros:** Won't slip out of your hand; colourful; cheapest iPhone

**Cons:** Only an 8GB version available; colours not to everyone's taste

**Full review:** [tinyurl.com/qjogxkf](http://tinyurl.com/qjogxkf)

### iPhone 5s

UPDATED  
20/09/13

As with previous iPhone 's' model launches, the 5s looks very similar to its predecessor and feels similar, too, with no noticeable added weight and not much new to look at. However, there are three colour options: silver, gold and 'space grey'. In addition to these colours, the 5s has a metallic ring around the Home button, which is part of the new Touch ID fingerprint sensor feature. This unlocks the device, although you'll still need a passcode as a backup to access the



device. In addition to unlocking the 5s, the sensor can be used to make secure purchases from the iTunes Store or the iBookstore. On the inside there's a new A7 chip, making it the first 64-bit phone. According to Apple this means the 5s is twice as fast as the 5. The camera has also been given a significant boost. While it's still 8Mp, it features a five-element Apple-designed lens with a larger f/2.2 aperture. A dual-LED flash should mean better low-light photos.

**Price:** 16GB £459; 32GB £499

**Pros:** Decent camera; new colours; fingerprint sensor

**Cons:** No battery improvements

**Full review:** [tinyurl.com/kn36zee](http://tinyurl.com/kn36zee)



## Technical specifications

Product	Processor	Display	RAM	Storage	Ports and connections	Graphics card	Star rating	Price
Mac mini	1.4GHz dual-core Intel Core i5	None	4GB	500GB (5400rpm)	2x Thunderbolt 2, 4x USB 3.0, HDMI, SDXC card slot, gigabit ethernet, audio in, headphone, IR receiver	Intel HD Graphics 5000	N/A	£399
	2.6GHz dual-core Intel Core i5	None	8GB	1TB (5400rpm)	2x Thunderbolt 2, 4x USB 3.0, HDMI, SDXC card slot, gigabit ethernet, audio in, headphone, IR receiver	Intel Iris Graphics	N/A	£569
	2.8GHz dual-core Intel Core i5	None	8GB	1TB Fusion Drive	2x Thunderbolt 2, 4x USB 3.0, HDMI, SDXC card slot, gigabit ethernet, audio in, headphone, IR receiver	Intel Iris Graphics	N/A	£799
iMac Retina 5K display	3.5GHz quad-core Intel Core i5 processor	27in Retina	8GB	1TB Fusion Drive	Headphone, SDXC card slot, 4x USB 3.0, 2x Thunderbolt 2, gigabit ethernet	AMD Radeon R9 M290X	N/A	£1,999
iMac	1.4GHz dual-core Intel Core i5	21.5in LED (BL)	8GB	500GB (5400rpm)	Headphone, SDXC card slot, 4x USB 3.0, 2x Thunderbolt 2, gigabit ethernet	Intel HD Graphics 5000	★★★★☆☆	£899
	2.7GHz quad-core Intel Core i5	21.5in LED (BL)	8GB	1TB (5400rpm)	Headphone, SDXC card slot, 4x USB 3.0, 2x Thunderbolt 2, gigabit ethernet	Intel Iris Pro Graphics	★★★★★★	£1,049
	2.9GHz quad-core Intel Core i5	21.5in LED (BL)	8GB	1TB (5400rpm)	Headphone, SDXC card slot, 4x USB 3.0, 2x Thunderbolt 2, gigabit ethernet	nVidia GeForce GT 750M with 1GB of GDDR5 memory	★★★★★★	£1,199
	3.2GHz quad-core Intel Core i5	27.5in LED (BL)	8GB	1TB (7200rpm)	Headphone, SDXC card slot, 4x USB 3.0, 2x Thunderbolt 2, gigabit ethernet	nVidia GeForce GT 755M with 1GB of GDDR5 memory	★★★★★★	£1,449
	3.4GHz quad-core Intel Core i5	27.5in LED (BL)	8GB	1TB (7200rpm)	Headphone, SDXC card slot, 4x USB 3.0, 2x Thunderbolt 2, gigabit ethernet	nVidia GeForce GTX 775M with 2GB of GDDR5 memory	★★★★★★	£1,599
Mac Pro	3.7GHz quad-core Intel Xeon E5	None	12GB	256GB (configurable to 512GB or 1TB)	4x USB 3.0, 6x Thunderbolt 2, dual gigabit ethernet, HDMI 1.4 Ultra HD	Dual AMD FirePro D300	N/A	£2,499
	3.5GHz six-core Intel Xeon E5	None	16GB	256GB (configurable to 512GB or 1TB)	4x USB 3.0, 6x Thunderbolt 2, dual gigabit ethernet, HDMI 1.4 Ultra HD	Dual AMD FirePro D300	N/A	£3,299
MacBook Pro with Retina display	2.6GHz dual-core Intel Core i5	13in Retina	8GB	128GB flash storage	2x Thunderbolt 2, 2x USB 3.0, HDMI, SDXC card slot	Intel Iris Graphics	★★★★★★	£999
	2.6GHz dual-core Intel Core i5	13in Retina	8GB	256GB flash storage	2x Thunderbolt 2, 2x USB 3.0, HDMI, SDXC card slot	Intel Iris Graphics	★★★★★★	£1,199
	2.8GHz dual-core Intel Core i5	13in Retina	8GB	512GB flash storage	2x Thunderbolt 2, 2x USB 3.0, HDMI, SDXC card slot	Intel Iris Graphics	★★★★★★	£1,399
	2.2GHz quad-core Intel Core i7	15in Retina	16GB	256GB flash storage	2x Thunderbolt 2, 2x USB 3.0, HDMI, SDXC card slot	Intel Iris Pro Graphics	N/A	£1,599
	2.5GHz quad-core Intel Core i7	15in Retina	16GB	512GB flash storage	2x Thunderbolt 2, 2x USB 3.0, HDMI, SDXC card slot	Intel Iris Pro Graphics + nVidia GeForce GT 750M	★★★★★★	£1,999
MacBook Pro	2.5GHz dual-core Intel Core i5	13in LED (BL)	4GB	500GB (5400rpm)	2x USB 3.0, HDMI, SDXC card slot, FireWire 800, Thunderbolt	Intel HD Graphics 4000	N/A	£899
MacBook Air	1.4GHz dual-core Intel Core i5	11in LED	4GB	128GB flash storage	2x USB 3.0, Thunderbolt	Intel HD Graphics 5000	★★★★★★	£749
	1.4GHz dual-core Intel Core i5	11in LED	4GB	128GB flash storage	2x USB 3.0, Thunderbolt	Intel HD Graphics 5000	★★★★☆☆	£899
	1.4GHz dual-core Intel Core i5	13in LED	4GB	128GB flash storage	2x USB 3.0, Thunderbolt, SDXC card slot	Intel HD Graphics 5000	★★★★★★	£849
	1.4GHz dual-core Intel Core i5	13in LED	4GB	128GB flash storage	2x USB 3.0, Thunderbolt, SDXC card slot	Intel HD Graphics 5000	★★★★★★	£999



## Apple AirPort Time Capsule

Full review: [tinyurl.com/Lh6pjqu](http://tinyurl.com/Lh6pjqu)



apple.com/uk, 2TB £249, 3TB £349

Back up your Mac with AirPort Time Capsule, Apple's wireless hard drive that works with Time Machine in OS X. This new version is also a Wi-Fi base station featuring 802.11ac technology, which is said to provide up to three times faster Wi-Fi than 802.11n.

Pros: Easy to use; combines network storage and high-speed 802.11ac Wi-Fi in a single unit

Cons: Expensive; doesn't include an ADSL or modem cable



## Apple AirPort Extreme Base Station

Full review: [tinyurl.com/mfdLLsc](http://tinyurl.com/mfdLLsc)



apple.com/uk, £169

The latest version of the AirPort Extreme Base Station offers dual-band Wi-Fi technology to provide wireless access for devices including Macs, iOS devices and the Apple TV.

Pros: Excellent performance; nice design; easy to set up

Cons: Expensive; lacks advanced features



## Apple Lightning to 30-pin adaptor

Full review: [tinyurl.com/nkqfbfz](http://tinyurl.com/nkqfbfz)



apple.com/uk, £25

If you want to connect the iPhone 5, 5s or 5c to an speaker system with a 30-pin dock, or other 30-pin audio or syncing dock device, then this is the way to do it (although we'd suggest the version with a cable to avoid the precarious balancing act). We're disappointed that it works only with audio and not video.

Pros: Enables you to connect the iPhone 5, 5s or 5c to older dock and speaker systems

Cons: Puts an extra 2cm on the iPhone 5; Lightning feels a bit small to be holding up an iPhone; doesn't output video; expensive



## Apple Thunderbolt Display

Full review: [tinyurl.com/nkhkzm8](http://tinyurl.com/nkhkzm8)



apple.com/uk, £899

For owners of the 2011 MacBook Air, the Thunderbolt Display is a fantastic way to get iMac-like features in one of the lightest laptops available. If your Mac doesn't have Thunderbolt, the inflexible Thunderbolt Display is a little less interesting.

Pros: Can charge Apple laptops; USB 2.0, FireWire 800 and ethernet connectivity; single cable from Mac cuts down clutter

Cons: Stand lacks flexibility; reflective screen limits display placement; few customisation options



## Apple 27in LED Cinema Display

Full review: [tinyurl.com/onaxe2n](http://tinyurl.com/onaxe2n)



apple.com/uk, £899

Apple's 27in LED Cinema Display makes a good companion to any Mac with a Mini DisplayPort connection, but is especially well suited to portable Mac users who can take advantage of the MagSafe power connector and the display's USB ports to attach peripherals.

Pros: MagSafe connector to charge Mac portables; built-in speakers and iSight

Cons: Limited adjustment options; glossy screen is prone to glare; Apple doesn't officially support using the display with anything but Mini DisplayPort



## Apple Magic Trackpad

Full review: [tinyurl.com/qd474vb](http://tinyurl.com/qd474vb)



apple.com/uk, £59

If you're a desktop Mac user and a fan of the multitouch trackpads on Apple's laptops, the Magic Trackpad is for you. It gives you the same clickable glass surface and multitouch gestures as those laptop trackpads in a wireless desktop model, with the bonus of nearly twice the trackpad area.

Pros: Large multitouch surface; works identically to Apple's laptop trackpads; rugged, portable design matches Apple's keyboards; easy setup

Cons: Not as precise as using a mouse or trackball; not ideal for large screens or multiple displays



## Apple Magic Mouse

Full review: [tinyurl.com/nc9o95e](http://tinyurl.com/nc9o95e)



apple.com/uk, £59

Although it's not perfect, the Magic Mouse successfully combines design and usability. It's great as a two-button wireless mouse, but if you need more than two buttons, the Magic Mouse is not for you.

Pros: Looks stunning; multitouch is easy to master; excellent tracking; very fast reconnect after idle

Cons: Low profile; may not be comfortable for larger hands; some modes are confusing; buttons and speed settings can't be programmed; expensive



## Apple Keyboard

Full review: [tinyurl.com/px5rj8c](http://tinyurl.com/px5rj8c)



apple.com/uk, £56

As a portable option that makes typing on the Mac more comfortable, Apple's own Bluetooth keyboard also complements any iOS device, although you would need an additional case or stand for your iPhone or iPad to make typing truly convenient.

Pros: Low profile; lightweight; portable; Apple function keys; instant pairing; great brushed-aluminium styling

Cons: Some function keys missing; no carry case; no numeric keypad; could be too cramped for some users; no dock for iOS devices



## Apple TV

Full review: [tinyurl.com/q3qa6pz](http://tinyurl.com/q3qa6pz)

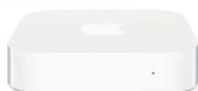


apple.com/uk, £79

There's a lot to like about the Apple's set-top box: it's well-built and easy to use; and now that Apple has reduced the price, it's no longer the most expensive option for streaming TV. However, the Apple TV – at least in the UK – still doesn't offer the variety of content offered by much of the competition.

Pros: Relatively inexpensive, easy-to-use and stylish set-top box

Cons: Not much content; ties you in to iTunes



## Apple AirPort Express Base Station

Full review: [tinyurl.com/q4xqsqz](http://tinyurl.com/q4xqsqz)



apple.com/uk, £79

Owning an Apple router is a great option for those with multiple Apple devices, and it's an easier and smarter way to set up and manage a network in the home or small office. Its big brother's faster ethernet connections and external hard drive support may be worth paying the extra for.

Pros: Small and neat; AirPlay functionality; dual antennae; good software interface that can be used from Mac or iOS device

Cons: No longer plugs directly into a wall; has only 100base-T ethernet sockets



## Apple OS X Yosemite

Full reviews: [tinyurl.com/ohv23hs](http://tinyurl.com/ohv23hs)

N/A

[apple.com/uk](http://apple.com/uk), Free

Apple's latest operating system is available to download now and comes with some exciting new features. The biggest of these is Continuity, which makes it easier to work with, and switch between, all your OS X and iOS devices. Yosemite has also been redesigned, making it easier to use.

Pros: Continuity between Mac OS and iOS; redesigned interface; free to upgrade

Cons: Not all of the features work on every Mac – AirDrop and Continuity



## Apple iOS 8

Full reviews: [tinyurl.com/kmavwnw](http://tinyurl.com/kmavwnw)

★★★★★

**Macworld**  
EDITORS' CHOICE

[apple.com/uk](http://apple.com/uk), Free

iOS 8 has a host of small but convenient tweaks (particularly in Messages, Mail and Photos, but throughout the system), and opens up new possibilities for app developers to get creative. Widgets are a big addition, third-party keyboards are a huge addition, and we can't wait to see what games developers do with Metal.

Pros: Continuity between Mac OS and iOS; widgets; QuickType and third-party keyboards

Cons: Needs a large amount of space to install



## Apple Final Cut Pro X 10.1

Full reviews: [tinyurl.com/phs7zc7](http://tinyurl.com/phs7zc7)

★★★★☆

[apple.com/uk](http://apple.com/uk), £199

With Final Cut Pro X, Apple's video editor has finally come of age, with improvements such as enhanced libraries and improved timing options. The software has also been optimised to make full use of the new Mac Pro.

Pros: Flexible media management; added editing functionality; third-party plug-in support; 4K editing workflow

Cons: Collaborative workflows needs careful management



## Apple Logic Pro X

Full reviews: [tinyurl.com/nfgavnz](http://tinyurl.com/nfgavnz)

★★★★★

**Macworld**  
EDITORS' CHOICE

[apple.com/uk](http://apple.com/uk), £139

Logic Pro X offers a lot of great new features at a price that even starving musicians can afford. Thanks to its easier-to-use interface, Logic Pro X becomes a viable next step for GarageBand users, and everyone with an iPad should be happy with the convenience wrought by the free Logic Remote app.

Pros: Affordable; easy-to-use interface; realistic sounds; great new features

Cons: Not compatible with 32-bit plug-ins



## Apple iTunes 12

Full reviews: [tinyurl.com/kj32hvu](http://tinyurl.com/kj32hvu)

★★★★☆

[apple.com/uk](http://apple.com/uk), free

Apple's new iTunes 12 makes the music manager cleaner, clearer and easier to use, but it's still missing out on a whole generation of social media. It's time Apple took iTunes apart and rebuilt it from scratch.

Pros: Cleaner interface; neat integration of media library and iTunes Store; apps starting to become less prominent

Cons: Remains a cluster of many disparate services; lacks focus; no iTunes Radio in the UK; lacks Facebook or social media integration; missing HD Audio



## Apple iLife: iMovie, iPhoto, iPhoto

Full reviews: [tinyurl.com/Lpz6sdL](http://tinyurl.com/Lpz6sdL),  
[tinyurl.com/L55ycea](http://tinyurl.com/L55ycea), [tinyurl.com/qa5bq4z](http://tinyurl.com/qa5bq4z)

★★★★★

[apple.com/uk](http://apple.com/uk), free upgrade or £10.49

Apple has overhauled its iLife range of applications, which have been redesigned to work with both OS X Mavericks and iOS 7. Along with support for iCloud integration and 64-bit coding, the software offers users a streamlined interface and hundreds of new features.

Pros: iMovie: Better editing tools; new interface. iPhoto: 64-bit support offers improved performance

Cons: iMovie: No more chapter markers. iPhoto: Photo Stream sharing options are poorly explained



## Apple iWork: Keynote, Numbers, Pages

First reviews: [tinyurl.com/mkfd9to](http://tinyurl.com/mkfd9to),  
[tinyurl.com/nov5uor](http://tinyurl.com/nov5uor), [tinyurl.com/ofht5qg](http://tinyurl.com/ofht5qg)

★★★★☆

[apple.com/uk](http://apple.com/uk), £13 each

It's been a long time coming, but Apple has finally updated its suite of iWork applications. Each program has been designed to be used on the Mac, iOS and iCloud, so you'll be able to edit a document from different devices. Not only that, but the suite has a new interface that promises to make creating beautiful documents easy.

Pros: Keynote: Simplified toolbar; new transitions and animations. Numbers: Beautiful interface; saves documents online. Pages: Excellent editing tools; Format Inspector

Cons: Keynote: Interface over-simplified. Numbers: Scrappy Excel conversion. Pages: Missing standalone page-layout tools



## iWork for iCloud beta: Pages, Keynote, Numbers

Full review: [tinyurl.com/kk5cvyv](http://tinyurl.com/kk5cvyv)

N/A

[apple.com/uk](http://apple.com/uk), free

[tinyurl.com/osz2w97](http://tinyurl.com/osz2w97), [tinyurl.com/nfn843c](http://tinyurl.com/nfn843c)

The different applications that make up iWork for iCloud are beautiful to behold and capable of making equally gorgeous documents. Although we encountered a few bugs, for example, you can't collaborate with others in Pages, it is still in beta. And it's free.

Pros: Gorgeous interface; can access and edit documents anywhere; saves documents online; free

Cons: Not compatible with all browsers; not as many tools as desktop counterparts



## Apple Aperture 3

Full review: [tinyurl.com/ppc2d6d](http://tinyurl.com/ppc2d6d)

★★★★☆

[apple.com/uk](http://apple.com/uk), £54

A lot has changed in this version of Aperture, so much in fact that it feels a little different, but it's all the better for it: improved RAW engine, updated sorting options, more powerful search features, much more versatile adjustments tools, among many others.

Pros: Vastly improved slideshows; impressive new brushes; multitouch aware; ability to split and merge libraries; easy export to Flickr and Facebook

Cons: Sporadic reports of problems when upgrading older libraries; web page creation not overhauled; need a powerful Mac and lots of RAM to run well



## Apple Logic Express 9

Full review: [tinyurl.com/qcyo2yu](http://tinyurl.com/qcyo2yu)

★★★★★

**Macworld**  
EDITORS' CHOICE

[apple.com/uk](http://apple.com/uk), £159

Logic 9 is first-class home-recording software for all types of musicians, especially guitarists. It offers streamlined audio editing, plenty of loops and instruments, stacks of virtual amps/speakers and pedals for guitarists, and it reads GarageBand files.

Pros: Plenty of virtual amp/speaker/pedal combos; ability to add chord diagrams to printed music; lots of loops and instruments; high-quality effects

Cons: Interface still dense despite streamlining; could use more templates and a tutorial for beginners



## Buyers' Guide

### iOS APPS: GAMES



#### TwoDots

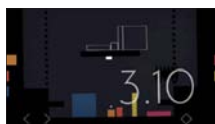
weplaydots.com, Free (in-app purchases)

Although connecting dots may not be the most thrilling of concepts, the introduction of levels with increasing difficulty throughout adds a level of addictiveness that the original 'Dots' just can't match. The simple design of the game still remains, with all the attention on the puzzle in hand.

Pros: Fun; simple design; addictive

Cons: Could get expensive if you don't resist in-app purchases

Full review: [tinyurl.com/oeznua](http://tinyurl.com/oeznua)



#### Thomas Was Alone

bossastudios.com, £3.99

Thomas Was Alone is artful without graduating into a full-on art game, and an accomplished piece of game design. It's an attractive, thoughtful and original series of platforming puzzles, with an unexpectedly satisfying (if light) story popping its head in from time to time. A fine iPad game.

Pros: Clever platform-puzzle gameplay; beautiful and original design; finely-tuned difficulty curve

Cons: Danny Wallace's voice-over is rather jaunty, though, this can be turned off; hardcore puzzle addicts may not find the game brutal enough

Full review: [tinyurl.com/Lv7gtse](http://tinyurl.com/Lv7gtse)



#### Leo's Fortune

leosfortune.com, £2.99

A visually dazzling, fast-paced – and now Apple Design Award-winning – platform game that's frequently a treat, but also sometimes a bit too tough for its own good. Still, the smart design ensures that almost anyone can finish the quest, and speedruns are there for the truly dedicated to master.

Pros: Plenty of levels; inventive traps; looks lovely; surprisingly great voice acting

Cons: A few too many leaps into the unknown; insanely tight speedrun targets

Full review: [tinyurl.com/ncq65cu](http://tinyurl.com/ncq65cu)



#### FTL: Faster Than Light

ftlgame.com, £6.99

It's not cheap for an iPad game, but FTL: Faster Than Light is well worth the money, thanks to its gripping, merciless gameplay and rich depth of content. (This game incorporates the Advanced Edition that PC gamers will be familiar with.) Highly recommended.

Pros: Tense gameplay; addictive; every game is different

Cons: Expensive; some might find it off-puttingly cruel

Full review: [tinyurl.com/nt7ymmk](http://tinyurl.com/nt7ymmk)



#### Threes!

asherv.com/threes, £1.49

Threes is a great iPhone puzzle game. Attractive, potentially addictive, simple yet full of strategic depth, Threes (or 'Threes!' to give the official title) is an early contender for iOS game of the year. A wholehearted recommendation.

Pros: Beautifully simple interface; real strategic depth

Cons: Lack of instant restart button

Full review: [tinyurl.com/qzyqwwL](http://tinyurl.com/qzyqwwL)



### iOS APPS: VIDEO & PHOTOGRAPHY



#### Adobe Lightroom Mobile for iPad

adobe.com/uk, free as part of Adobe Creative Cloud

If you are a Creative Cloud subscriber and a power user of Lightroom 5.4, downloading this to your iPad is a no-brainer. Despite several glaring omissions, which hopefully will be addressed in version 2.0, it offers a useful mobile extension to a professional photography workflow.

Pros: Sync with Lightroom Desktop; Collections; range of image adjustments and preset effects; integration with iOS camera roll

Cons: Limited rating system; no keywording; no RAW support; available only to Creative Cloud subscribers; slow to sync; no Flickr or Behance; exports low-res proxy files

Full review: [tinyurl.com/pmet6r7](http://tinyurl.com/pmet6r7)



#### VSCO Cam

vsco.co, free

A great set of editing tools along with some beautiful, evocative photo presets, available in both free and paid versions, makes VSCO Cam an essential app for anyone who takes photos on an iPhone. It elevates simple snaps to something approaching art, while showcasing the creative potential of Apple devices to all.

Pros: Stunning photo presets; excellent photo editing tools; ability to import images; full-resolution image making and editing; good support

Cons: Some tools are available only on newer iDevices; nine 'Top In-App Purchases' could prove expensive if bought individually over time

Full review: [tinyurl.com/mLu542x](http://tinyurl.com/mLu542x)



#### Analog Film

ordinaryfactory.wordpress.com, £1.99

It's difficult to determine how authentic Analog Film is in relation to the film stock it claims to recreate digitally, but the results are both attractive and evocative.

Despite the lack of even basic editing tools, we love the choice of black-and-white effects, which can add style and substance to even the most casual of snaps.

Pros: Around 250 film stock presets produces subtle yet varied film-like results; plenty of black-and-white variations; simple user interface; compatible with older iOS devices

Cons: Lacks editing tools, including ability to adjust, crop, straighten images; no frames or borders

Full review: [tinyurl.com/ngynyos](http://tinyurl.com/ngynyos)



#### Scout Camera

crushapps.com, £1.49

Scout Camera's great strength is to place emphasis on the photographer capturing a moment, not the process of editing images retrospectively using your iPhone or iPad. Although you can combine the app with others to good effect, it still excels as a creative tool that requires little more than a keen eye and steady hand.

Pros: Great range of adjustable colour filters and artistic crops; beautiful, understated user interface; emphasis on capturing the moment not editing images endlessly

Cons: No optional grid lines for ensuring straight photographs; no ability to import existing photos for editing; lacks full range of editing tools; rather modest iOS 7 makeover

Full review: [tinyurl.com/n6Ltopk](http://tinyurl.com/n6Ltopk)



#### Perfect B&W

ononesoftware.com, £1.49

There are plenty of photo manipulation apps on the market, but for getting arty with monochrome images, especially with one-click looks, this one is great. Precision tools among the Options would be interesting, but at this price it's hard to compare the app with more powerful features present in desktop image-editing software.

Pros: Instant preset artistic looks; takes full advantage of iOS camera; integration with social media; compositional aids; non-destructive workflow; inexpensive

Cons: Some of the manual adjustment options could be fine-tuned and improved; more border/frame choices would be welcome

Full review: [tinyurl.com/nzz24jc](http://tinyurl.com/nzz24jc)





### Paperless

crushapps.com, £1.99

Paperless will appeal to those who want to keep track of daily tasks, and anyone who has more long-term goals and even dreams. As Paperless doesn't set date sensitive goals, it's a good way to ensure things get done at your own pace, free of the disappointment of missing deadlines.

Pros: Attractive, productive user interface; wide appeal; good range of features including ability to sync notes via Dropbox; search function; password protection

Cons: Procrastinators may find the lack of set deadlines and alerts frustrating; no desktop version; slightly steeper learning curve than some list-making apps

Full review: [tinyurl.com/oLgnzqk](http://tinyurl.com/oLgnzqk)



### Vesper

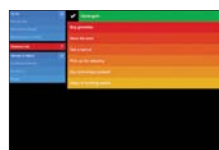
vesperapp.co, £2.49

Vesper shows a lot of potential with a beautiful, aesthetically pleasing user interface that's a pleasure to use. It's a fine example of Apple's iOS 7 radically streamlined redesign, and we only hope new features – synching of notes particularly – are on the developer's to-do list.

Pros: Clean, attractive interface; intuitive design makes for productive note-taking and good navigation; ability to add and adjust text and add photos; shows great potential

Cons: Synching options on the to-do list; no iPad native version; no Mac version; cheaper and free alternatives; a few iOS 7 bugs noted on Twitter

Full review: [tinyurl.com/ktkbbdc](http://tinyurl.com/ktkbbdc)



### Clear+

realmacsoftware.com, £2.99

Embracing Apple's iOS 7 redesign and new features, Clear+ is one to-do list that's done right, leaving no excuses not to start organising your daily tasks. Beautifully considered, Realmac Software have crafted an app that's intuitive to use and has real longevity, one that best showcases Apple's recent focus on simplicity of design.

Pros: Potential to speed productivity and organise daily tasks; now with iOS 7 tweaks and enhancements; attractive, intuitive interface; modest learning curve

Cons: No Reminders as yet; not a radical overhaul of the previous Clear app; iOS 7 only update; some features are iPad only; interface may look like a Windows phone app

Full review: [tinyurl.com/L4twwm8](http://tinyurl.com/L4twwm8)



### Day One

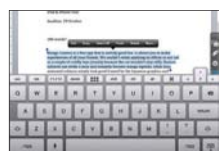
dayoneapp.com, £6.99

With Day One, the filters are off. Free of the Facebook effect, your life and thoughts become your own. There are no work colleagues to fear offending, no friends who'll feel left out. It's a diary for the social-media age that you don't need to share.

Pros: Integrates with iOS version; markdown support; calendar-based input

Cons: No local encryption; only one image per entry

Full review: [tinyurl.com/ggtjm44](http://tinyurl.com/ggtjm44)



### Parallels Access

parallels.com/uk, £54 per machine, per year

It's a shame that a truly innovative piece of software that shows real transformative potential is so expensive. Compared to its free rivals, Parallels Access is the clear winner on feature count, and its ability to rejig a desktop display on to an iPad's screen is second-to-none, but at £54 per machine per year it's more than we'd pay.

Pros: Application process is fantastic; makes Mac remote desktop much easier to use

Cons: Too expensive; replaces a similar but cheaper app; currently works only on iPad

Full review: [tinyurl.com/p68ebm2](http://tinyurl.com/p68ebm2)



### Facebook

facebook.com, free

On the whole Facebook 8.0 for iPad and iPhone is an improvement over the previous version. It's a slick and clean app that's easy to use, and with it installed you may hardly ever use the Facebook website again. We're also glad to see that Facebook improve matters with a slew of speed enhancements and bug fixes.

Pros: Clean interface; ability to limit sharing to select audiences; good integration with iOS

Cons: No easy way to just view stories from Friends; not so easy to manage friends lists; no trending or detailed information

Full review: [tinyurl.com/Lyn5xLL](http://tinyurl.com/Lyn5xLL)



### TuneIn Radio Pro

tunein.com, 69p

The addition of ads on what's billed as a pro app aside, TuneIn Radio Pro is still an excellent choice for enjoying radio from the UK and anywhere in the world. The ability to catch up with on-demand podcasts and record content for offline playback is a bonus, which only enhances an already great listening experience.

Pros: Impressive choice of content from around the world; ability to catch up with podcasts; record function; option to save favourite channels

Cons: Recent addition of ads on TuneIn Radio Pro; broadcasters restrict some content due to regional rights; similar TuneIn Radio is free

Full review: [tinyurl.com/LLuLqo5](http://tinyurl.com/LLuLqo5)



### Flipboard

flipboard.com, free

Flipboard is a must-have app, more so with the introduction of iOS 7, one that showcases Apple's invention to great effect, while maintaining a lead over similar social-news aggregators. Beautifully tactile and responsive, it makes reading anything on your iDevice an absolute pleasure.

Pros: Attractive, clean user-friendly design; good range of pre-defined news categories; ability to customise news and sources to suit own interests

Cons: Some new features are iOS 7-specific; minor bugs reported

Full review: [tinyurl.com/Lb3qg83](http://tinyurl.com/Lb3qg83)



### Shazam

shazam.com, free

For music fans, Shazam is an essential app, one that should also appeal to casual users who simply want to identify a song from an ad or drama. Its ability to identify even the most obscure tracks is very impressive.

Pros: Excellent hit rate identifying tracks; improved user interface; good iTunes and YouTube integration; ability to share track information via Facebook and Twitter

Cons: Auto Tagging currently iPad only; mainstream tracks dominate music discovery extras in Shazam Pulse and interactive maps

Full review: [tinyurl.com/ndbht56](http://tinyurl.com/ndbht56)



### Yahoo Weather

uk.yahoo.com, free

Yahoo Weather stands out thanks to accurate forecasts, good balance of information and an attractive yet simple design. The addition of Flickr photos reflecting different times of the day from across the world, is both a worthy addition and a distraction on days when you wouldn't want to go out unless you had to.

Pros: Accurate forecasts; attractive design; cool use of Flickr/Project Weather photos; ability to save locations to favourites; interactive radar, satellite, heat, and wind maps

Cons: No Notification Centre integration or weather alerts; Ultraviolet information is available only in select countries

Full review: [tinyurl.com/qemq7zn](http://tinyurl.com/qemq7zn)



## Buyers' Guide

### SPEAKERS



#### Simple Audio Listen

Full review: [tinyurl.com/pompxbn](http://tinyurl.com/pompxbn)



[www.simpleaudio.com](http://www.simpleaudio.com), £399

A price tag of £399 is pretty steep for a set of speakers that will just sit on a desk with your computer. However, we were impressed by the sound quality, and they will earn their keep if you use your Mac and Windows PC as your main music system at home.

Pros: Compact design; impressive sound quality with firm bass; Bluetooth option for mobile devices

Cons: Expensive; no equaliser controls



#### Maxell MXSP-BT3100

Full review: [tinyurl.com/Lf4y4he](http://tinyurl.com/Lf4y4he)



[uk.maxell.eu/en/](http://uk.maxell.eu/en/), £170

The Maxell MXSP-BT3100 is around half the price of the similarly specified competition, which makes it look better value. But £170 is still no small outlay and we'd expect better quality and a less plasticky or spitty sound for the money. Against some higher-priced wireless speakers we've reviewed, it doesn't look such bad value.

Pros: Relatively intelligible voice reproduction; extended and harmonious treble compared to much competition

Cons: Plasticky coloration; squawks at higher volumes; no aptX capability



#### Edifier Luna Eclipse

Full review: [tinyurl.com/onbz63n](http://tinyurl.com/onbz63n)



[edifier-international.com](http://edifier-international.com), £150

Fabulous styling goes some way to endear these speakers, and some clever electro-acoustic tricks help move the sound upscale for their size. Ultimately, the speakers proved just too wearing on the ears, brought down by low-grade amplifiers and a third-rate Bluetooth audio codec.

Pros: Sleek; modern styling; discreet; spacious sound; active crossovers

Cons: Edgy; brittle sound at times; lacking in musical naturalness



#### Bayan Audio Soundbook X3

Full review: [tinyurl.com/oevqdp7](http://tinyurl.com/oevqdp7)



[bayanaudio.com](http://bayanaudio.com), £250

This is a smart and well-made compact Bluetooth speaker, with the added benefit of an easy-tune FM radio. While competent for quieter or muffled background kitchen chat radio, it lacks any subtlety when in its full-volume element. It may have some style and convenience, but it's overpriced.

Pros: Clever industrial design like an opening book; neat style

Cons: Muffled indistinct sound; no high-frequency presence; tune-free bass



#### Audio Pro Addon T10

Full review: [tinyurl.com/qbnzyny6](http://tinyurl.com/qbnzyny6)



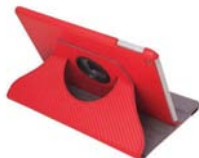
[audiopro.com](http://audiopro.com), £300

The Audio Pro Addon T10 can appeal with its retro square box, and its decent build quality, plus enormous potential for sheer volume that helps to justify the high price. Overall, though, it failed to inspire thanks to a flat, monotonic sound and lower mid-range.

Pros: Loud and full of bass

Cons: Little subtlety; expensive for available sound quality

### IOS ACCESSORIES



#### Everything Tablet 360° Rotating Case

Full review: [tinyurl.com/ntzoo6w](http://tinyurl.com/ntzoo6w)



[everythingtablet.co.uk](http://everythingtablet.co.uk), £29

Everything Tablet's 360° Rotating Case is a highly protective yet lightweight accessory for the iPad Air, and its stand (provided you avoid the rear-most slot in portrait mode) is stable and versatile. The price is okay, too. There are three colours to choose from: cherry red, orange and black.

Pros: Protective; lightweight; clever stand function

Cons: Stand becomes unstable in certain slots in portrait mode



#### Covert Slim Folio Case

Full review: [tinyurl.com/n7m89k3](http://tinyurl.com/n7m89k3)



[covertaccessories.com](http://covertaccessories.com), £19

The Slim Folio iPhone 5s case is great value and packs in a lot of useful features without it feeling like overkill. Due to the vibrant and limited colour options, though, it would likely fare best with a younger audience.

Pros: Affordable; stylish; viewing stand; credit card holder

Cons: Card holder is a bit tight; no neutral colour options



#### Kensington KeyFolio Pro

Full review: [tinyurl.com/oc522pm](http://tinyurl.com/oc522pm)



[kensington.com](http://kensington.com), £99

The KeyFolio Pro keyboard hits a sweet spot of functionality and weight. We're particularly keen on the removable keyboard that enables the case to function without its additional weight. This works extremely well.

Pros: High quality professional-style case; detachable keyboard; thin and light keyboard with raised chiclet-style keys; keyboard has Function keys; magnetic clasp stand

Cons: Enclosed case for iPad; at £99 it is bulky with the keyboard included; doesn't function well when on your lap



#### Kensington KeyCover Plus

Full review: [tinyurl.com/md57p3h](http://tinyurl.com/md57p3h)



[kensington.com](http://kensington.com), From £99

We liked the Kensington KeyCover for iPad Air. It's a lightweight keyboard cover for the iPad Air with a solidly backlit keyboard. We have reservations about the battery life of the device, and you'll need to be careful to keep the backlit keyboard off, and turn off the device when not in use. But it's a small, light and functional option.

Pros: Sturdy protective case; solid plastic keys; easy to type on; good Function keys; backlit key feature

Cons: iPad Air clips in only face down; backlit keys can drain battery



#### Kujali case for iPad mini

Full review: [tinyurl.com/ompg9tv](http://tinyurl.com/ompg9tv)



[kujali.com](http://kujali.com), £29

The Kujali iPad mini case is an all-around winner. It's durable, sleek, functional and affordable. We're excited to see what other tech accessories the Kujali brand will offer in the future.

Pros: Attractive; sturdy; extra protective skin; lifetime warranty

Cons: Just one colour option





**AKG K311**

uk.akg.com, £15

At £15, it's hard to be too unkind to the AKG K311. They're not the best set of earphones we've heard, though they're not the worst either. And at this price they're the cheapest we've come across for a long time. We'd probably suggest going up to the Apple EarPods at £25, but for £15 this is a good set of headphones.

Pros: Extremely cheap; comfortable; sturdy

Cons: Sound quality is markedly average; no iPhone controls

Full review: [tinyurl.com/n3cjhij](http://tinyurl.com/n3cjhij)**Klipsch Image X10i**

klipsch.com, £249

Klipsch's Image X10i in-ear headphones come with a two-year warranty, which is reassuring when you are spending a whopping £249. But, if you have that sort of money to spend, and you're looking for a good, comfortable pair of in-ear headphones – without caring so much about making calls – then these are a great buy.

Pros: Incredibly comfortable; light; good acoustic seal; really clear sound reproduction; you can find them for under £100 on Amazon

Cons: Bling; not great for phone calls

Full review: [tinyurl.com/qzrfmh3](http://tinyurl.com/qzrfmh3)**Nocs NS600 Crush**

eu.nocs.se, £149

If you're into dance and electronic music, then these headphones deliver exceptional quality. They're not cheap, though, and if you have a wider taste in music you should probably go for something a little more accurate.

Pros: Powerful bass; stylish design; Kevlar-coated wire; great for dance fans

Cons: Mid-range isn't so hot for traditional rock music

Full review: [tinyurl.com/mztrp96](http://tinyurl.com/mztrp96)**Plantronics Backbeat 903+**

plantronics.com/uk, £50

It can be a bit tricky getting the darn things hooked over your ears, but the light, rugged design of the Backbeats make them a good choice when you're exercising at the gym or out running in the park. The audio quality is also very good, considering the current low price.

Pros: Affordable; lightweight; good sound quality

Cons: Can be fiddly hooking them over your ears; the maximum volume level isn't very high

Full review: [tinyurl.com/pkdayrx](http://tinyurl.com/pkdayrx)**Altec Lansing Muzx Ultra mXx606**

alteclansing.com, £80

These in-ears have a smart-looking remote on the cable and excellent overall sound quality. The sound is rich and warm, with good breadth across the spectrum; the bass feels punchy without overshadowing any of the upper notes.

Pros: Interesting designs; fantastic sound quality across a wide spectrum of musical styles

Cons: Slight artificial feel to some guitar music

Full review: [tinyurl.com/nr8tra4](http://tinyurl.com/nr8tra4)**Turtle Beach i60**

turtlebeach.com, £349

The asking price seems a bit high and puts these in the same league as Bose and Sennheiser. We'd also expect noise cancellation for this kind of money, but the surround sound quality is superior, and as a result, we suspect that it would take a lot of external noise to distract you.

Pros: Great selection of audio presets available via iOS app; use Bluetooth and Wi-Fi at the same time

Cons: No noise cancellation; audio levels aren't uniform; high price

Full review: [tinyurl.com/qawoz9L](http://tinyurl.com/qawoz9L)**Logitech UE 6000**

logitech.com/en-gb, £169

We like these headphones a lot. They combine stunning bass and superb treble audio with nice styling, and the active noise cancellation technology makes them ideal for long journeys. They come with a padded carry case, an audio splitter and a replaceable audio cable, too.

Pros: Amazing bass and treble audio; iPhone controls; separate earphone cable; noise-cancellation technology

Cons: Heavy weight; audio not great for rock and vocal music

Full review: [tinyurl.com/pLfV8bh](http://tinyurl.com/pLfV8bh)**The House of Marley Buffalo Soldier**

thehouseofmarley.co.uk, £79

The Buffalo Soldier headphones are a decent pair of on-ears with good environmental credentials. The audio is on a par with other headphones at this price point, but we were impressed with the fit and finish.

Pros: Great build quality; good audio; solid environmental credentials; it's nice to have tech products made from wood

Cons: The whole Bob Marley branding thing seems a bit strange

Full review: [tinyurl.com/L7r9dzy](http://tinyurl.com/L7r9dzy)**Logitech UE 9000**

logitech.com/en-gb, £299

The high price of the Logitech UE 9000 is what's stopping us recommending them outright. If you can find them at a discount in the sub-£200 price range, we'd give them serious consideration for the convenience of the combination of Bluetooth and high-capacity internal battery.

Pros: Very well constructed; plenty of detail across all frequencies

Cons: Mediocre active noise cancelling; minimal headband padding; high price

Full review: [tinyurl.com/odr6b4b](http://tinyurl.com/odr6b4b)**Jabra Revo**

jabra.co.uk, £187

Although the Jabra Revo wireless headphones are not exactly cheap, they warrant their price tag thanks to the good looks, features, comfort, durability, wireless performance and overall sound quality. These are a very solid pair of headphones.

Pros: Stylish appearance; comfortable; durable; impressive audio performance; good battery life; NFC pairing available; touch control panel

Cons: Not cheap

Full review: [tinyurl.com/nzfghmh](http://tinyurl.com/nzfghmh)



## Canon EOS 1200D

canon.co.uk; £349 (body only), £399 (18-55mm lens)

While the 18Mp EOS 1200D might not offer all the bells and whistles of models higher up the range, such as a tilting and swivelling LCD screen, it's possible to get professional-looking results. As such this is a very affordable route to getting sharper, more obviously 'pro' pictures from the get go.

Pros: Affordable; well built; professional-looking results; easy to operate

Cons: Fixed LCD screen; no built-in wireless connectivity; maximum capture speed is modest

Full review: [tinyurl.com/oy6m7Ly](http://tinyurl.com/oy6m7Ly)



## Sony Cyber-shot DSC-RX10

sony.co.uk; £1,049

Resembling a cross between a digital SLR and a Howitzer cannon, the Sony Cyber-shot RX10 looks like a serious contender for serious photography, although it isn't an inexpensive option, when you add up what a semi-pro DSLR body and a similar zoom would cost, investing in this makes for a sound investment.

Pros: Solid magnesium alloy build; tilting LCD and eye-level viewfinder; impressive zoom; knockout image quality

Cons: High price may limit appeal; big lens means bulky body

Full review: [tinyurl.com/obaywbj](http://tinyurl.com/obaywbj)



## Nikon 5300

nikon.co.uk; £829

For a beginner's camera, the D5300's layout is as busy as a photo enthusiast would want, while it's as speedy to get up and running from cold as we'd expect from a DSLR in this price bracket. More importantly, it's capable of capturing an impressive degree of detail.

Pros: Excellent image quality; tilting LCD screen; built-in digital effects; easy-to-navigate user interface

Cons: Glossy body cheapens look; pricey

Full review: [tinyurl.com/kbb342p](http://tinyurl.com/kbb342p)



## Pentax K-3

pentax.co.uk; £1,199 (18-55mm lens)

Providing excellent rendition of colours and sharp images, the Pentax K-3 offers slightly more bang for your buck than the Nikon D5300. If you need a lens, the 18-55mm zoom kit is the best bet at £1,199.

Pros: Solid feel; professional-grade body; in-body image stabilisation; switch on or off anti-aliasing filter

Cons: No Wi-Fi connectivity; blocky design

Full review: [tinyurl.com/q8tq23e](http://tinyurl.com/q8tq23e)



## Nikon D610

nikon.co.uk; £2,299 (24-85mm lens)

Nikon's DSLR comes across as a subtle update of the previous D600 rather than major overhaul. Like its predecessor, the D610 is an affordable route into full-frame photography for anyone wedded to the Nikon brand. You can't fault the images, so this is a purchase where the head wins out over the heart.

Pros: Large full-frame sensor; waterproofed body; workhorse-like build; swift response times; large and bright optical viewfinder

Cons: No integrated Wi-Fi; expensive if you don't need full-frame DSLR; chunky and bulky

Full review: [tinyurl.com/qcczouz](http://tinyurl.com/qcczouz)



## Sony A58

sony.co.uk; £419 (18-55mm lens)

Sharp and well-saturated images from the camera, as well as ultra-smooth video clips, confirm this cheaper-than-average model as a jack of all trades. So if you don't mind an electronic viewfinder as opposed to the traditional optical version supplied by a regular DSLR, the Sony A58 can be considered a steal.

Pros: Well saturated colours and warm feel to images; rear LCD can be tilted up or down; DSLR-style handling yet quicker to get video recording up and running

Cons: The rear LCD screen is smaller than most rivals (even if it can be tilted)

Full review: [tinyurl.com/ouje6wb](http://tinyurl.com/ouje6wb)



## Pentax K-50

pentax.co.uk; £599 (18-55mm lens)

The Pentax K-50 is so nearly a great camera, but a slightly bland design and lack of adjustable LCD when used as viewfinder let it down. However, if you plan on using this camera in the rain and snow, the semi-pro level of ruggedness makes for a worthy investment.

Pros: Camera body and supplied lens are both weatherproofed, while internal sensor shift shake reduction mechanism means specially image stabilised lenses are not required

Cons: Body design reflects price in being chunky with big buttons and relatively frill free; LCD is fixed rather than angle adjustable

Full review: [tinyurl.com/pf5xgkn](http://tinyurl.com/pf5xgkn)



## Sony DSC-RX1R

sony.co.uk; £2,599 (35mm lens)

Thanks to a lens aperture range from f/2.0 to f/22 plus a focal distance up to infinity, it's a jack-of-all-trades device, providing lovely shallow-depth-of-field results where a subject's sharp but the background's attractively soft. Superb it may be, but whether the RX1R is worth it depends on the application to which you may wish to put it.

Pros: High-resolution full-frame sensor in a small-ish camera package; high-quality bright aperture lens; built-to-last metal construction suggests a device fashioned for war

Cons: Hard to justify on price alone; no viewfinder built in (accessory viewfinder is pricey, too); short-ish battery life of 200 plus shots

Full review: [tinyurl.com/ma6sqxs](http://tinyurl.com/ma6sqxs)



## Alpha A580

Sony, [www.sony.co.uk](http://www.sony.co.uk); £569 (body only) or £649 (including 18-55mm lens)

The A580 has many of the same core features as the smaller A55 for £100 less – including a top whack light sensitivity setting of ISO 12800, although shooting video isn't quite as fluid or intuitive.

Pros: A cheaper alternative to the A55 with identical resolution and many of the same core technologies

Cons: Chunky build

Full review: [tinyurl.com/ndf7qok](http://tinyurl.com/ndf7qok)



## Nikon D7100

nikon.co.uk; £1,099

The Nikon D7100 is a new range-topping 24Mp APS-C sensor DSLR for aspirational amateurs. It's a respectable showing, although if extras such as weatherproofing aren't required there are cheaper alternatives delivering a very similar still image quality.

Pros: Weather resistant; high-res backplate LCD; high res sensor; top plate LCD window as shortcut to key settings; compatible with over 60 Nikon lenses; 51 selectable AF points

Cons: Basic image quality no better than most DSLRs costing £500+; non-angle adjustable LCD; common image artefacts such as pixel fringing still present

Full review: [tinyurl.com/o57zqlr](http://tinyurl.com/o57zqlr)





### Fujifilm FinePix S9400W

Full review: [tinyurl.com/o423c5w](http://tinyurl.com/o423c5w)

★★★★☆

[fujifilm.eu/uk](http://fujifilm.eu/uk), £269

While the S9400W may not excel, it's one of the very best options out there in terms of zoom range, build and handling within its lower-priced section of the market, which is why we're happy to give it an above average score.

Pros: Big zoom power offers a wealth of framing opportunities; affordable; good build and handling; manual features alongside the fully automatic

Cons: Small-ish sensor; no rechargeable Lithium-ion battery supplied with this model, small and pokey viewfinder; fixed LCD screen; results no match for the DSLR it resembles



### Fujifilm X-E2

Full review: [tinyurl.com/k89vwdc](http://tinyurl.com/k89vwdc)

★★★★★

[fujifilm.eu/uk](http://fujifilm.eu/uk), £1,149 (18-55mm lens)

Improvements over the earlier X-E1 ([tinyurl.com/Lk8j3qy](http://tinyurl.com/Lk8j3qy)) seem to be largely performance based, and come down to enhanced speed and accuracy.

That said, if you're considering spending this amount, then we'd also recommend taking a look at Fujifilm's X-T1 ([tinyurl.com/ogstmv6](http://tinyurl.com/ogstmv6)).

Pros: Semi-professional compact system camera with an eye-level viewfinder; rangefinder-like controls; build quality is reminiscent of an even pricier Leica camera

Cons: Pricey if you don't need an eye-level viewfinder; other CSCs are more intuitive to use

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### Fujifilm X-A1

Full review: [tinyurl.com/Lej65yq](http://tinyurl.com/Lej65yq)

★★★★☆

[fujifilm.eu/uk](http://fujifilm.eu/uk), £359 (16-50mm lens)

The X-A1 is Fujifilm's handsome-looking entry-level interchangeable lens X-series compact, a range noted for reviving the critical fortunes of the brand with its classic styling and a feature set more geared to enthusiasts and professionals than the happy-snappy brigade.

Pros: Premium look and feel; swift and accurate autofocus; plenty of effects and Fujifilm's Film Simulation modes provide a point of difference; tilting LCD

Cons: A larger handgrip would have been useful; longer zooms in danger of making the camera feel a tad 'front heavy'; no built-in eye-level viewfinder



### Sony A5000

Full review: [tinyurl.com/kysrxfy](http://tinyurl.com/kysrxfy)

★★★★☆

[sony.co.uk](http://sony.co.uk), £419 (16-50mm lens)

It might not look the flashiest on test, but the stripped back Sony A5000 is one of the easiest and most accessible routes to achieving more professional-looking shots for anyone upgrading from a smartphone. It's affordable, too.

Pros: Large 20.1Mp resolution from an equally big APS-C sensor results in detailed shots; tilting LCD screen; built-in flash; fairly priced kit with Power Zoom

Cons: No viewfinder or hotshoe



### Panasonic Lumix DMC-GM1

Full review: [tinyurl.com/m3jupwp](http://tinyurl.com/m3jupwp)

★★★★☆

[panasonic.co.uk](http://panasonic.co.uk), £569 (12-32mm lens)

Pocket-sized if you remove the lens, the GM1 maintains a premium feel thanks to a lightweight yet sturdy aluminium frame and a DSLR-like magnesium-alloy finish. Images are surprisingly detailed, while colours straight out of the camera are engagingly warm.

Pros: Playing card dimensions; sturdy DSLR-strength build provides a premium feel; size hasn't unduly affected handling and the images are a knockout

Cons: So-so battery life; touch-sensitive onscreen icons are small, as are the hard keys on the backplate; lacks an eye-level viewfinder



### Olympus OM-D E-M10

Full review: [tinyurl.com/ko3dpng](http://tinyurl.com/ko3dpng)

★★★★☆

[olympus.co.uk](http://olympus.co.uk), £699 (14-42mm lens)

Offering 16Mp stills and full-HD video in one compelling package, the Olympus E-M10 is the retro-styled camera for photo enthusiasts who couldn't justify spending a 'grand on previous OM-D E-M1 models (see below).

Pros: Classic design provides a premium feel; pop-up flash and Wi-Fi connectivity; tilting LCD screen with high resolution; 1.4-million-dot eye-level finder

Cons: Smaller sensor size than other big-name rivals; nose butts up against LCD screen when using eye-level viewfinder



### Canon PowerShot S120

Full review: [tinyurl.com/p56qdLc](http://tinyurl.com/p56qdLc)

★★★★☆

[canon.co.uk](http://canon.co.uk), £449

If you're looking for compact that will ape a digital SLR's quality without sacrificing portability, then the PowerShot S120 is a good choice. Despite its pocket size and slender proportions, it's solidly built. It's also easy to use and the images it produces are rich.

Pros: Solid feel; high-quality construction; touchscreen control; customisable lens ring function will appeal to those who love getting hands-on with camera operation

Cons: For the money, you could buy a cheap DSLR; lacks a handgrip; omits an eye-level viewfinder



### Olympus OM-D E-M1

Full review: [tinyurl.com/k3e4u6v](http://tinyurl.com/k3e4u6v)

★★★★☆

[olympus.co.uk](http://olympus.co.uk), £1,299 (12-50mm lens)

Despite a few reservations, the OM-D E-M1 is right up there at the pinnacle of what a compact interchangeable-lens camera can achieve. For most of us, in comparison with a DSLR, the image and build quality will be more than good enough to prompt a possible switch of allegiance.

Pros: Solid build quality; dust- and waterproofed; in-body image stabilisation; decent image quality

Cons: Small image sensor; buttons feel squashed in



### Canon PowerShot G16

Full review: [tinyurl.com/oz6ddq8](http://tinyurl.com/oz6ddq8)

★★★★☆

[canon.co.uk](http://canon.co.uk), £529

Aside from the rock-solid build quality and DSLR-feature set, the pictures are also worth treasuring, with colours beautifully realistic and detail pin-sharp. If you stick under ISO 6400 to avoid an obvious deterioration of fine detail, you'll find this compact hard to beat

Pros: High-end premium shooter; solid set of features; impressive pictures

Cons: Missing tilting rear LCD panel; price a little on the high side



### Samsung NX2000

Full review: [tinyurl.com/qaqz27b](http://tinyurl.com/qaqz27b)

★★★★★

[samsung.com/uk](http://samsung.com/uk), £499 (20-50mm lens)

More evolution than revolution, the NX2000 should prove popular with photographers on a budget, who want a better quality of camera for those special occasions, but not the added bulk of a DSLR and larger lenses. For those who already own Galaxy phones and tablets, navigating its menus and icons will feel familiar.

Pros: Good value; large touchscreen; sharply detailed and colour-rich images straight out of the camera with minimal effort; increased connectivity options

Cons: If you do need to remove the media card it's a pain, as the NX2000 has opted for the small and fiddly fingernail-sized microSD; no onboard flash or eye-level viewfinder

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# Buyers' Guide

## MONITORS



### AOC Q2770PQU

aoc-europe.com/en, £420

AOC's latest professional display may not be packaged in the finest of chassis, but the Q2770PQU is a high-quality model that's well suited for use with a Mac. It's also the finest quality panel we've tested at this price.

Pros: High 2560x1440 resolution; superb image quality; telescopic, rotating stand; low power consumption

Cons: Bland styling

Full review: [tinyurl.com/Lkcejxc](http://tinyurl.com/Lkcejxc)

★★★★★

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### NEC MultiSync E243WMI

necdisplay.com, £200

The NEC MultiSync E243WMI could prove ideal as a high-quality monitor that you can run all day without adding much to your electricity bills. Specified at just 13W, this monitor ought to prove cost-effective over time. The display is neat and accurate, well-built and functional.

Pros: Nicely built; fully adjustable stand; excellent overall colour accuracy; well rendered text; good screen uniformity; decent sRGB coverage; Eco modes and low power use

Cons: Menu system poorly implemented; more expensive than budget consumer designs

Full review: [tinyurl.com/kncgvou](http://tinyurl.com/kncgvou)

★★★★☆



### Philips 234E5QHAWL

philips.co.uk, £130

The Philips 234E5QHAW is a good-value IPS panel at the popular 23in size. It should have reasonable luminance consistency and good colour coverage and accuracy. There's some penny-pinching on the frame and the stand is weak, but this monitor offers good quality and modestly stylish looks.

Pros: Cheap; AH-IPS; good-quality display; great viewing angles; easy-to-use menu controls; nice looks; HDMI and MHL connectivity; speakers; ultra-thin bezel

Cons: Not 100 percent sRGB coverage; poor stand; average build quality average; not a lot of interfaces

Full review: [tinyurl.com/o2ggrv8](http://tinyurl.com/o2ggrv8)

★★★★☆



### AOC i2769Vm

aoc-europe.com/en, £200

While the build quality is average, reflecting where the costs have been saved, it's not bad to look at and, while it wouldn't take a lot of punishment, it isn't particularly flimsy. Throw in the excellent colour uniformity and consistency, and you have a decent, large-screen, budget 27in IPS option.

Pros: Large screen for £200; IPS panel; wide viewing angles; good colour consistency; configuration options

Cons: Mediocre build quality; awkward menu system; more luminance variation than most IPS panels

Full review: [tinyurl.com/Ldtanwc](http://tinyurl.com/Ldtanwc)

★★★★☆



### Samsung S24C650PL

samsung.com/uk, £170

Although Samsung's bland-looking 24in PLS screen offers excellent colour accuracy and consistency, it's let down by light leak and inconsistency in luminosity. For general use, the viewing angles make it a good screen to demonstrate ideas to a group, but for designers and photographer there are better options.

Pros: Very good colour consistency and accuracy; 5ms refresh rate; telescopic stand; rotates and swivels; USB hub in base

Cons: Light leak all along the bottom of the screen; awful luminance consistency; bland looks; not 100 percent sRGB; weak and tinny speakers

Full review: [tinyurl.com/pkLazjr](http://tinyurl.com/pkLazjr)

★★★★☆



### NEC MultiSync EA273WMI

nec-display-solutions.co.uk, £285

The relatively low resolution for the size and the mid-range price tag mark it out as a solid performer. For standard office duties where the power-saving features can come into play, it's a decent quality display that will serve well.

Pros: Good viewing angles; excellent colour uniformity; plenty of contrast; solid build quality; display rotates; eco power saving features; lots of interfaces

Cons: Middle of display brighter than everywhere else; boxy design; relatively low resolution for the size; impossible to see menu controls in dark rooms

Full review: [tinyurl.com/n6yahxr](http://tinyurl.com/n6yahxr)

★★★★☆



### Asus PQ321QE

asus.com/uk, £2,999

Amazing detail on the screen makes it ideal for all manner of applications where you need detail rather than speed. The quality of the screen is commendable making this a great purchase for those editing 4K video or needing as much detail as possible.

Pros: Fantastic resolution delivers incredible detail; excellent colour accuracy; puts out a large amount of light; good contrast; stand swivels; monitor tilts

Cons: Expensive; requires high-end graphics to produce 60Hz mode; only a single DisplayPort interface; colour gamut is some way off sRGB

Full review: [tinyurl.com/k2rLs8a](http://tinyurl.com/k2rLs8a)

★★★★☆



### Samsung S27B971D

samsung.com/uk, £850

Although the price is a little high, you can't argue with the build quality or colour consistency and accuracy as these are excellent. For photographers and designers who want something stylish and don't mind paying for it, there's lots of screen space to enjoy.

Pros: Great build quality; stylish looks; touch-sensitive menu controls; high 2560x1440 resolution; lots of screen space at 27in; bundled leads; excellent colour accuracy

Cons: Expensive; contrast and brightness aren't anything to write home about; stand doesn't offer much flexibility

Full review: [tinyurl.com/pwc4yph](http://tinyurl.com/pwc4yph)

★★★★☆



### Hanns.G HW246HBB

www.hannsg.com/eu/en, £117

For general Mac use, this is a good purchase, offering stylish looks, lots of screen space and good contrast ratio. The colour uniformity and accuracy are both commendable and only the lack of complete sRGB coverage and the uneven luminosity are drawbacks. Otherwise, this is a lightweight and well priced panel.

Pros: Lightweight; plenty of screen space; stylish two-tone looks; good value; great colour accuracy and good uniformity; plenty of contrast

Cons: Stand is fairly insubstantial; average brightness; two areas of wildly differing brightness; limited interfaces; mediocre sRGB coverage

Full review: [tinyurl.com/Lrt48o3](http://tinyurl.com/Lrt48o3)

★★★★★

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### BenQ GW2760HS

benq.co.uk, £210

This is a superb monitor to choose to go with a Mac mini or as an external display for your MacBook Air or MacBook Pro. At around £200, it offers premium quality and high performance at a price normally associated with a much lower-quality display.

Pros: Large 27in display; flicker-free technology; non-glossy AG matte coating; fantastic colour gamut range; unobtrusive bezel; amazingly low price

Cons: Resolution not as high as Apple Cinema Display; colour accuracy isn't as good as a high-end monitor

Full review: [tinyurl.com/nf3wvfy](http://tinyurl.com/nf3wvfy)

★★★★★

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### iFi nano iDSD

ifi-audio.com, £165

The iFi nano iDSD serves as a great upgrade to the headphone sound of MacBooks, iPhones and iPads. It's superbly made and brings a major upgrade to CD-level sound, as well as open up the many possibilities for real high-resolution music that are now available from computers and mobile devices.

Pros: High-resolution audio playback; relatively low cost; great build quality

Cons: A zipping noise is just audible when changing volume while music is playing

Full review: [tinyurl.com/nfrwsgd](http://tinyurl.com/nfrwsgd)

★★★★★

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### Elgato Thunderbolt Dock

elgato.com/uk, £189

We've tried all four of the Thunderbolt docks currently available on the market, and found that Elgato's just nudges ahead in build quality and style. And while it seems to be based on exactly the same reference design used by CalDigit and StarTech, Elgato's offering lets you charge your iPad.

Pros: Three USB 3.0 ports; gigabit ethernet and HDMI 1.4 available for any Mac with Thunderbolt; added iPad charge capability with software kext

Cons: Limited audio quality; no FireWire

Full review: [tinyurl.com/qzjufge](http://tinyurl.com/qzjufge)

★★★★☆



### Asus USB-AC56

asus.com/uk, £60

The Asus USB-AC56 is an effective upgrade that can bring faster wireless networking to your Mac. You'll need a USB 3.0 port for best results, but under the right conditions you may get close to half-gigabit wireless transfers at short range, and the benefit of increased performance at longer ranges, too.

Pros: Upgrades Wi-Fi to 11ac; fast real-world speed; increased range

Cons: Bulky add-on; rudimentary software

Full review: [tinyurl.com/o9xwdm7](http://tinyurl.com/o9xwdm7)

★★★★★

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### StarTech Thunderbolt Station

uk.startech.com, £230

If you need to expand your port count or just make it quicker and easier to interface a MacBook with your home/office setup each day, then the StarTech Thunderbolt Station will serve you well.

Pros: HDMI output; three USB 3.0; relatively inexpensive; cable included

Cons: HDMI limited to full-HD; USB 3.0 working slowly; won't charge iPad

Full review: [tinyurl.com/o98xwd6](http://tinyurl.com/o98xwd6)

★★★★☆



### View Quest Hepburn

viewquest.co.uk, £149

Overall, we'd suggest that the View Quest Hepburn speaker is ideal for anyone with a love of vintage or retro-style, as it'll sit nicely in a living room or kitchen and provide satisfactory sound that will suit a dinner party, barbeque or general background music for a day bustling around the house.

Pros: Gorgeous vintage design with multiple colour options; Bluetooth speaker & DAB radio combination; easy to use and simple setup

Cons: Some distortion at highest volume; no rechargeable battery; high price tag considering the sound quality

Full review: [tinyurl.com/ku9bvnw](http://tinyurl.com/ku9bvnw)

★★★★☆



### Pure Evoke D2

pure.com, £99

The Pure Evoke D2 packs great audio quality for the size. The combination of digital radio and Bluetooth ensure it has a lot of functions. Its small stature will keep it from being your main speaker, but it makes a great digital radio with iPhone or iPad connectivity for the kitchen or bedroom. It offers a lot of functionality for the price.

Pros: Small footprint; good audio clarity; Bluetooth connection; easy to set up

Cons: Separate Pure ChargePAK required to use portable battery; small size limits volume

Full review: [tinyurl.com/ohnrvoa](http://tinyurl.com/ohnrvoa)

★★★★☆



### CalDigit Thunderbolt Station

caldigit.com, £179

The CalDigit Thunderbolt station is a useful addition for anyone who needs up to three USB 3.0 ports, or a quick way to connect all their peripherals. Improved audio quality and consistent HDMI operation would make this product stand out from the crowd.

Pros: USB 3.0; gigabit ethernet and HDMI 1.4 available to any Mac with Thunderbolt; convenient

Cons: Poor audio quality; erratic HDMI issues; no FireWire; low bus power on USB ports

Full review: [tinyurl.com/kdhylDn](http://tinyurl.com/kdhylDn)

★★★★★

**Macworld**  
EDITORS' CHOICE



### Elgato EyeTV Netstream 4Sat

elgato.com/uk, £259

If you have a satellite dish, or can accommodate one and wish to dovetail your media with your computer network, then Elgato's Netstream 4Sat is a delight. Performance, styling and build quality are first-class, and being able to record four different HDTV channels is worth every penny of the asking price.

Pros: Four satellite tuners in one box; great build quality; smart software

Cons: Cumbersome channel editing for iPhone/iPad; unable to update firmware on a Mac

Full review: [tinyurl.com/qemoawc](http://tinyurl.com/qemoawc)

★★★★★

**Macworld**  
EDITORS' CHOICE



### IK Multimedia iRig Pro

ikmultimedia.com, £120

As an all-in-one unit for connecting your live instruments to a DAW, the iRig Pro is very easy to recommend. IK Multimedia has thought carefully about the needs of musicians and built something simple to use that produces great results. It might be small in size, but it packs a seriously impressive punch.

Pros: Easy to use; no discernible latency; excellent sound quality

Cons: Gain dial is a little fiddly to adjust; no headphone out

Full review: [tinyurl.com/nu4dx6w](http://tinyurl.com/nu4dx6w)

★★★★☆



### Focusrite iTrack Solo

uk.focusrite.com, £129

In essence, the iTrack Solo does the one thing you ask of any recording device, it simply gets out of the way and lets you make music without any fuss. Focusrite also includes a code for its Scarlett plug-in suite and Ableton Live Lite 8 in the box, which makes an already excellent package even better value for money.

Pros: Excellent audio quality and a simple setup with the iPad

Cons: The Device Link cable feels frail and awkwardly short

Full review: [tinyurl.com/ozfszdx](http://tinyurl.com/ozfszdx)

★★★★☆

## Buyers' Guide

### LASER PRINTERS



#### HP Colour LaserJet Pro M177fw

Full review: [tinyurl.com/Lzzgbpf](http://tinyurl.com/Lzzgbpf)



hp.com/uk, £274

The £274 price tag represents good value for money, as the LaserJet Pro provides excellent print quality and useful connectivity features. However, running costs for both colour- and mono printing are above average, which means that it can be recommended only for small businesses that need laser-quality on an occasional basis.

Pros: Excellent print quality; ethernet; Wi-Fi and AirPrint connectivity

Cons: Slow colour printing; very expensive toner cartridges



#### Samsung M2070W

Full review: [tinyurl.com/nnhmt6k](http://tinyurl.com/nnhmt6k)



samsung.com/uk, £129

The M2070W is a neatly designed and versatile laser printer that will appeal to home workers or small businesses that need a fast, high-quality mono printer for letters and other business documents. However, the relatively low capacity of Samsung's toner cartridges means that running costs are above average.

Pros: Initial purchase price; built-in Wi-Fi; iOS app for Apple mobile devices

Cons: Expensive toner cartridges; no ethernet or automatic duplex printing



#### Dell C1765nf

Full review: [tinyurl.com/no2evbb](http://tinyurl.com/no2evbb)



dell.co.uk, £189

It's not often that we recommend Dell hardware to our readers. However, there aren't many colour laser printers available for £200 or less, so the Dell C1765nf is a good option for home workers or small businesses that need an affordable workhorse printer.

Pros: Fast, affordable laser printer; 30,000ppm duty cycle; iOS and Android apps; USB and ethernet

Cons: No Wi-Fi; modest capacity; colour printing is expensive



#### Epson AcuLaser C3900DN

Full review: [tinyurl.com/L8Lxjk7](http://tinyurl.com/L8Lxjk7)



epson.co.uk, £400

It might be overkill for many small businesses – especially the self-employed people who work from home – but the C3900DN will earn its keep if you need a fast printer that can handle fairly high volumes of work with competitive running costs.

Pros: Fast; good print colour for mono and colour; competitive running costs

Cons: Initial purchase price of toners is very high



#### Kyocera FS-C5150DN

Full review: [tinyurl.com/mun9sa6](http://tinyurl.com/mun9sa6)



kyocera.co.uk, £240

If you need to print lots of colour documents every day, then the FS-C5150DN may not be fast enough for you. However, its competitive running costs ensure it's still a good choice for any business needing a high-quality printer.

Pros: Low purchase price; competitively priced toner cartridges

Cons: No Wi-Fi or AirPrint; colour printing is relatively slow



### INKJET PRINTERS



#### Canon Pixma iP2850

Full review: [tinyurl.com/nwxLw7](http://tinyurl.com/nwxLw7)



canon.co.uk, £40

The low cost of the iP2850 is certainly attractive, so it's bound to appeal to home users and students who need a basic, affordable printer. Print quality is also very good for such a low-cost device, but the high cost of the black ink cartridge outweighs any savings you might make on the printer's initial purchase price.

Pros: Inexpensive to buy; pigmented black ink produces very good mono text

Cons: Black ink cartridges are very expensive; no Wi-Fi; Mac support could be improved



#### HP OfficeJet 4630

Full review: [tinyurl.com/p9hLgme](http://tinyurl.com/p9hLgme)



hp.com/uk, £89

The purchase price of the OfficeJet is hard to beat, especially as it includes two-sided printing, a document feeder and AirPrint connectivity for under £100. Print quality and speeds are also respectable for such an affordable printer. Unfortunately, printing costs are higher than we'd like – especially for mono printing.

Pros: Initial purchase price is very competitive; built-in Wi-Fi and AirPrint; fax and document feeder

Cons: Expensive ink cartridges; no ethernet interface



#### Epson Expression Home XP-412

Full review: [tinyurl.com/n3g7kLq](http://tinyurl.com/n3g7kLq)



epson.co.uk, £89

The Expression Home XP-412 could certainly be faster, and lacks a few useful options such as duplex printing. However, it's a compact and affordable printer that provides good quality and reasonable running costs. It's a good option for home users who need to print only occasional documents or photos.

Pros: Affordable inkjet printer; supports Wi-Fi and AirPrint; good text and graphics output

Cons: Slow; no duplex printing



#### Epson Expression Premium XP-610

Full review: [tinyurl.com/kd5mvvq](http://tinyurl.com/kd5mvvq)



epson.co.uk, £149

The Expression Premium XP-610 crams a lot into its neat and compact design. Text output is excellent, with smooth, clean text outlines, and the photo-black ink adds contrast to photo output, producing crisp, bold colours. It's fast, too, for such a compact printer, turning out 11ppm for text, and 8ppm for colour.

Pros: Compact and affordable multifunction printer for home users; supports Apple AirPrint; duplex printing and AirPrint for iOS

Cons: No ethernet; modest capacity; cost for text printing is a little high



#### HP OfficeJet 7610

Full review: [tinyurl.com/q96qdkg](http://tinyurl.com/q96qdkg)



hp.com/uk, £200

It's good to see a printer that provides an affordable A3 printing option, and the only real disadvantage with the OfficeJet 7610 is that it's pretty bulky. However, it produces very good results, with bright, strong colours and crisp smooth text that comes close to laser quality.

Pros: Versatile A3/A4 printer; includes scanner, copier and fax; supports Apple AirPrint

Cons: Big and bulky; duplex printing is an optional extra





### CalDigit T3

Full review: [tinyurl.com/lvrsolq](http://tinyurl.com/lvrsolq)

★★★★☆

[caldigit.com](http://caldigit.com); £586, 6TB

The CalDigit T3 is a versatile desktop RAID system that makes good use of original Thunderbolt speeds with its preinstalled hard disks. It offers greater capacity than systems that rely on 2.5in drives, and reasonable value in capacity per pound at under 10p per gigabyte.

Pros: Large capacity from three RAIDed disks; sturdy build; relatively quiet in operation

Cons: Slower at random file access; no data security in RAID 0



### LaCie Little Big Disk Thunderbolt 2

Full review: [tinyurl.com/kpkzf79](http://tinyurl.com/kpkzf79)

★★★★★

[lacie.com/uk](http://lacie.com/uk); £1,000

It may not be bus-powered, but the cute Little Big Disk 2 can certainly be toted when required. Not only compact and blissfully quiet in use, it's also the fastest storage drive of any persuasion, albeit at the higher price bracket at exactly £1 per gigabyte. But if you need super-speed storage up to 1000GB there's none better.

Pros: Compact; stylish and quiet; supremely quick

Cons: Not cheap at £1/GB; still requires mains power

**Macworld**  
EDITORS' CHOICE



### Promise Technology Pegasus2 R6

Full review: [tinyurl.com/Ldda3u8](http://tinyurl.com/Ldda3u8)

★★★★☆

[promise.com](http://promise.com) £2,499, 18TB

As much as the blistering speed available from a tightly knitted collection of fast hard disks, the Promise Pegasus2 R6 impresses with its cool and confident character. That, and the attention that's gone into support of the whole drive through its advanced management software utility.

Pros: Huge 18TB capacity; SSD-like speeds; comprehensive software management

Cons: Unique capacity/speed combination doesn't come cheap



### WD My Passport Pro

Full review: [tinyurl.com/ke53fap](http://tinyurl.com/ke53fap)

★★★★★

[wdc.com/en](http://wdc.com/en); £239, 2TB; £349, 4TB

Portable drives generally trade performance for portability, but the My Passport manages to provide desktop-levels of performance wrapped up in a portable design. It's also competitively priced when compared with other RAID drives, making it a great choice for professional users who need a fast, portable backup device.

Pros: High-performance and high-capacity; Thunderbolt interface; supports RAID 0; RAID 1; JBOD

Cons: Bigger and heavier than a conventional portable drive; no USB interface

**Macworld**  
EDITORS' CHOICE



### Synology DS1513+

Full review: [tinyurl.com/qbf3w4y](http://tinyurl.com/qbf3w4y)

★★★★★

[synology.com](http://synology.com); £630

While the new DSM 5.0 software interface falls victim to the opinion-dividing Windows 8 look, the performance and feature set of this Synology NAS drive lift it clear of all competitors. Its performance in serving files is second to none, which lets it earn its keep.

Pros: Fast; easy-to-learn interface

Cons: Windows 8-like software interface; pricey

**Macworld**  
EDITORS' CHOICE



### Toshiba STORE.E Slim

Full review: [tinyurl.com/khqfnqb](http://tinyurl.com/khqfnqb)

★★★★☆

[toshiba.co.uk](http://toshiba.co.uk); £65

The Toshiba STORE.E Slim for Mac is relatively tough and affordable. It's generously sized internally at 1000GB, while modestly sized externally, taking very little space in your bag or pocket. Performance is as good as any notebook hard disk.

Pros: Large capacity; attractive price; relatively quiet

Cons: Slow



### Freecom Mobile Thunderbolt/USB 3.0 Drivemg

Full review: [tinyurl.com/nluk7b2](http://tinyurl.com/nluk7b2)

★★★★☆

[freecom.com](http://freecom.com); £179

If you're looking for an unfussy, lightweight portable drive to connect by Thunderbolt or USB 3.0, the Freecom Mobile Drive mg is one smart solution to look out for. It's available in 1TB or 500GB capacities using disk technology and offers a better balance of capacity against price compared to flash drives.

Pros: Slim; lightweight design; relatively tough magnesium construction; high capacities at cheaper prices than flash storage

Cons: Inevitably slower speed than flash; mechanical drives less resilient



### Sony HD-SG5

Full review: [tinyurl.com/pubdtmf](http://tinyurl.com/pubdtmf)

★★★★☆

[sony.co.uk](http://sony.co.uk); £75

If performance is your main priority, then there are faster Thunderbolt and SSD drives. However, the slimline design of the SG5 is both attractive and practical, and it'll be a particularly good choice for owners of the MacBook Air who want a portable backup drive that they can carry around with them.

Pros: Slimline design; weighs just 130g; USB 3.0

Cons: Modest performance; no Thunderbolt



### Seagate Central

Full review: [tinyurl.com/Lf3x47a](http://tinyurl.com/Lf3x47a)

★★★★☆

[seagate.com/gb/en](http://seagate.com/gb/en); £100

Most of Seagate's NAS drives are aimed at business users, but the Seagate Central drive is designed for use in the home. There's nothing innovative about this drive, but it gets the basics right. It's competitively priced and easy to use, if very slow when writing files to disk.

Pros: Attractively priced; easy to use; good support for Mac and iOS devices

Cons: Very slow for copying files; no RAID protection of data



### Western Digital My Cloud

Full review: [tinyurl.com/pnqmn9k](http://tinyurl.com/pnqmn9k)

★★★★☆

[wdc.com/en](http://wdc.com/en); £120 (2TB)

To make a home hardware-based personal cloud, the device and software must be easy to set up and use, and be completely reliable. With the My Cloud, Western Digital has made that setup straightforward, even if the need for separate device and WD server accounts is asking for trouble.

Pros: Relatively quiet; clear and approachable web admin interface; smart iOS apps

Cons: Slow write speeds; Java requirement for Mac remote access; problems in setting up remote access; security issues with US-based DDNS



## Adobe Premiere Elements 12

Full review: [tinyurl.com/pygte69](http://tinyurl.com/pygte69)

★★★★★



adobe.com/uk, £78, £63 (upgrade)

If you're a home movie buff who wants to use titles and other effects to create more professional results, then Premiere Elements 12 will provide all the editing tools you need at an attractive price. Its new Guided Edit mode also makes it a great option for beginners who want to learn more advanced editing techniques.

Pros: Powerful video-editing tools at a competitive price; Guided Edit mode provides help for new users

Cons: Requires fast processor and plenty of memory to edit HD video



## QuarkXPress 10

Full review: [tinyurl.com/oz7fha9](http://tinyurl.com/oz7fha9)

★★★★☆

quark.co.uk, £959, £359 (upgrade)

If you're a QuarkXPress 8 or 9 user, there are plenty of reasons to upgrade. (If you've got an earlier version, you'll have to pay the full price). And anyone unhappy with Adobe's switch to a rental-only model for Creative Cloud will appreciate the fact you can still buy or upgrade QuarkXPress 10 outright.

Pros: New user interface; improved image displays; new tools; Cocoa code

Cons: Expensive; loss of some familiar menus



## Smith Micro Manga Studio 5 EX

Full review: [tinyurl.com/psadd3s](http://tinyurl.com/psadd3s)

★★★★☆

manga.smithmicro.com, \$210 (£130)

Whether you opt for Manga Studio 5 or 5 EX, you're getting a worthy upgrade to 4 EX that isn't just a powerful tool for creating comic book art – but, as many artists are proving, is powerful for creating amazing digital art in general.

Pros: Excellent performance; updated brush engine; layer modes; multiple file handling; custom brush creation; new user interface; EX4 page and story file importing

Cons: Only two features differentiate between the cheaper standard version and the EX version



## Maxon Cinema 4D R15

Full review: [tinyurl.com/nprhhdh](http://tinyurl.com/nprhhdh)

★★★★☆

maxon.net; Prime £720, Broadcast £1,380, Studio £3,120, upgrade from £276

Overall this release adds stability and refinements, as well as more flexibility and power – especially on the rendering side. Most of the updates seem to have been well thought-out, and definitely build on what was already a very solid package.

Pros: Ease of use; new Team Render; newly developed Irradiance Cache; updated Bevel tool; Intel Embree in physical renderer; extremely stable

Cons: Hoped for more updates to modeling workflow; no updates to BodyPaint 3D; no updates to UV editing



## Autodesk Mudbox 2014

Full review: [tinyurl.com/o3mmgt4](http://tinyurl.com/o3mmgt4)

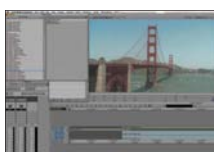
★★★★☆

autodesk.co.uk, £840, upgrade £588

Regardless of any retopology issues, Mudbox remains a great choice for producing digital sculptures and is unmatched in 2D/3D texture painting. However, since the main new features in Mudbox 2014 are for retopology – and they're not up to par with those found in the competition, it's difficult to recommend the 2014 upgrade.

Pros: Top-notch 3D sculpting and 2D/3D painting workflows; shallow learning curve

Cons: Retopologising imported or scanned models requires that models be prepped prior to retopology



## Avid Media Composer 7

Full review: [tinyurl.com/kjg3hst](http://tinyurl.com/kjg3hst)

★★★★☆

avid.com/uk, £862, £262 (upgrade)

Most of the changes with Media Composer 7 are performance related rather than adding killer new features. Existing Avid customers will love these changes as they speed up the workflow significantly, but if you're not already committed to Media Composer then this probably won't convince you.

Pros: Ability to dynamically extract resolution from hi-res sources; more audio options; cheapest version yet

Cons: Relies on keyboard shortcuts; stereo workflow requires 16GB RAM; spanning markers are clunky; window system can be messy



## Adobe InDesign CC

Full review: [tinyurl.com/m3gvmqo](http://tinyurl.com/m3gvmqo)

★★★★☆

adobe.com/uk, £17 per month single-app plan, £37 a month for teams

InDesign CC contains very few new features – from a user's perspective this isn't a major upgrade. However, if your work involves creating ePub books, you'll want it just for the improvements to ePub formatting. Numerous enhancements to the font menus make choosing fonts much more efficient and flexible.

Pros: Retina display support; font menu and ePub improvements; QR code generator

Cons: Meagre new features



## Adobe Edge CC

Full review: [tinyurl.com/kw7po7t](http://tinyurl.com/kw7po7t)

★★★★☆

adobe.com/uk, £17 per month single-app plan, £37 a month for teams

Unless you require the animation features of Edge Animate, we would find the price hard to justify. For more experienced teams, we're not sure how useful are these tools when simpler tools may suffice. However, if you're already a Creative Cloud member and heavily wedded to Adobe's app ecosystem, they may prove more useful.

Pros: Tight integration with other Creative Cloud applications; preview design and code easily on iOS and Android devices; use web fonts on your desktop

Cons: Applications lack native UI and share an inconsistent design; preview functions limited to Chrome browser; applications not available to purchase separately



## Adobe Illustrator CC

Full review: [tinyurl.com/kcuu7uv](http://tinyurl.com/kcuu7uv)

★★★★☆

adobe.com/uk, £17 per month single-app plan

Illustrator CC introduces three new features that will be a useful addition to every designers toolkit. The first of these is the Touch Type tool, which lets you individually edit each letter. Secondly, you can now have a brush made up of a raster image. And finally, there's the Kuler online palette generation tool.

Pros: Smarter workspace appearance; extensive resources; Kuler iPhone app interaction; improved type control

Cons: Commitment to CC, uninspiring bitmap image strokes



## Adobe Dreamweaver CC

Full review: [tinyurl.com/ny34xej](http://tinyurl.com/ny34xej)

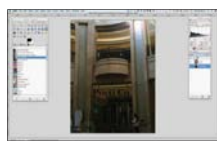
★★★★☆

adobe.com/uk, £17 per month single-app plan

For those wedded to Dreamweaver, upgrading is a no-brainer, even if there's hardly a glut of new features. It's also a powerful tool for working on sites created with the program itself, as you'd expect. For those who've abandoned Dreamweaver, there's little reason to return. For newcomers, it's a decent product.

Pros: Edge Web Fonts integration; user-friendly responsive site workflow; great CSS Designer panel

Cons: Default responsive layout is dated; still a weighty – and sometimes sluggish – app; 'Adobe OS' UI can be fiddly



### GIMP 2.8.10

Full review: [tinyurl.com/k7wnsux](http://tinyurl.com/k7wnsux)



[gimp.org](http://gimp.org), Free

When using GIMP, you soon realise just what the little paid-for productivity touches are worth in other applications. There are interface niggles and it's also slow at times. However, it's free, so giving it a trial should be a no-brainer. You've got nothing to lose but time.

Pros: Free; constantly updated; OS X Mavericks support; many useful and some unique tools; new cage transform; rotatable brushes; layer groups and improved text tool

Cons: Slow operation; clunky dialogs; proprietary file format; no file management/image organisation



### CyberLink PhotoDirector Ultra 5

Full review: [tinyurl.com/p4em2fq](http://tinyurl.com/p4em2fq)



[cyberlink.com](http://cyberlink.com), £79

Still keeping focus on organisational tasks, the 64-bit PhotoDirector also gains strength in the image-processing and correction areas with this release. Features such as HiDPI support, HDR Bracketing, Split Toning and Channel Curves are welcome, as is automatic stacking in the Photo Browser.

Pros: HiDPI and 64-bit support; RGB channel curve adjustments; auto-stack groups of shots; bracketed HDR; output to 4K video slideshow

Cons: No .PSD support; lens profiles database needs more expansion; automatic stacking a bit hit-and-miss



### Pixelmator 3.0 FX

Full review: [tinyurl.com/naztkjL](http://tinyurl.com/naztkjL)



[pixelmator.com](http://pixelmator.com), £20

Pixelmator feels bit like a cross between Photoshop, Motion and QuarkXPress – although there's no CMYK support for print workflows. It would be nice if filters could be applied as live or 'smart' effects, but the power and variety on offer here is welcome.

Pros: Good value; rewritten for OS X Mavericks; new Layer Styles and Effects; liquify tools; versatile; Retina display support; GPU acceleration via Core Image

Cons: No photo management/cataloguing; smart effects would be a bonus; lack of cross platform support might bother some; App Store download only



### Corel AfterShot Pro

Full review: [tinyurl.com/ouay3y7](http://tinyurl.com/ouay3y7)



[corel.com](http://corel.com), £80

Decently priced and powerful, there's a lot to like about AfterShot Pro. The lack of some tools is a downside, but you can assign an external editor in the Preferences for fine detail work. This is a fast and powerful Raw tool, with strong colour correction, while using Layers and Regions is good for selectively sorting portions of a photo.

Pros: Speedy Raw workflow; Layers and Regions adjustments; Adjustment presets; third-party plug-ins support; GPU hardware acceleration

Cons: No .PSD support; relatively low number of tools; not the most powerful cataloguing workflow; no Retina display support



### Alien Skin Exposure 5

Full review: [tinyurl.com/kL5tcxL](http://tinyurl.com/kL5tcxL)



[alienskin.com](http://alienskin.com), \$149 (£89)

While this isn't a radical update in terms of the number of effects you are getting, the interface change so that far more grunge and grime effects can be applied at once is very welcome. It's also still the best film- and retro effect plug-in money can buy.

Pros: New Polaroid film emulation; new lighting effects; redesigned interface; changes to some of the presets; save own combinations; grunge-orientated effects more flexible

Cons: Not enough new effects; can only flip effects not rotate them; previews are split screen with no side-by-side option



### PicSketch

Full review: [tinyurl.com/n5mv36z](http://tinyurl.com/n5mv36z)



[softease.biz](http://softease.biz), £2.99

PicSketch produces some good effects, but making the surrounding scribbling part of a separate mode that doesn't even turn the photo into a sketch is a little stupid. It's cheap, but the sketch styles get repetitive too quickly, making this app one for the occasional conversion rather than if you need to do it all the time.

Pros: Cheap; good results easily attainable; various paper backgrounds; some preset sketch effects; blending and colouring options

Cons: Control for brush size is a blunt instrument; surround scribbles in a separate mode; Preset mode doesn't turn photo into a sketch; not enough control over process



### Adobe Photoshop Elements 12

Full review: [tinyurl.com/kLbb49o](http://tinyurl.com/kLbb49o)



[adobe.com/uk](http://adobe.com/uk), £78, £65 (upgrade)

While the user interface could use some tweaking to make it more intuitive, this has many useful photo-editing and organising tools for hobbyists who don't want to fork out for the professional version of Photoshop. We'd suggest looking into cheaper alternatives such as iPhoto or Aperture before purchasing Elements, though.

Pros: Effects, textures and frames add fun ways to edit photos; new features such as Content-Aware Move and Pet Eye are frequently useful

Cons: Some textures, frames and Guided Edits are gimmicky; interface is clumsy and unintuitive; Revel feature costly if more than 50 photos are required



### Corel Painter X3

Full review: [tinyurl.com/nkd2bmd](http://tinyurl.com/nkd2bmd)



[corel.com/uk](http://corel.com/uk), £315, £158 (upgrade)

If you're looking to upgrade from a previous version, there are some pretty enticing improvements to X3 that may well make it worth your while, but like all upgrades, it's whether you feel that the additions will be of use to your own creative process.

Pros: Intuitive improvements; affordable

Cons: Steep learning curve



### Adobe Photoshop CC

Full review: [tinyurl.com/Lo9Leu9](http://tinyurl.com/Lo9Leu9)



[adobe.com/uk](http://adobe.com/uk), £17 per month single-app plan

This release has plenty for you to get your teeth into. There's something for everyone, but the real star is the Camera Shake Reduction filter. The improvements to the 3D engine are also notable. As it is, this is a decent release with usable functions rather than unnecessary bloat.

Pros: Camera shake filter; 3D performance increased; Spot Removal in Camera Raw excellent; upsampling is better than CS6; vector objects with corners can be re-edited

Cons: Smart Sharpen not massively better; upsampling not as good as third-party plug-ins; limited 3D-format support; numerous windows use old colour scheme



### Adobe Lightroom 5

Full review: [tinyurl.com/ljcwse2](http://tinyurl.com/ljcwse2)



[adobe.com/uk](http://adobe.com/uk), £57 or from £17 per month for Creative Cloud subscription

Busy photographers may view Lightroom 5 as the release that enables them to let go of Photoshop for most tasks. New features keep coming and propel Lightroom ahead of Apple's Aperture. The fact you don't have to subscribe to own your copy is also good.

Pros: Lots of ways to sort images; build catalogues; creative presets; Healing Brush good for simple areas; considerable control over exposure; retrograde geotagging

Cons: Library getting overly complex; some bugs; Upright tool well hidden; Advanced Healing Brush not called that in the app





## Nuance Dragon Dictate

Full review: [tinyurl.com/mfwrcwg](http://tinyurl.com/mfwrcwg)

★★★★☆

[nuance.co.uk](http://nuance.co.uk); £125 (£65 upgrade)

Although OS X includes voice-command software, Nuance Dragon Dictate for Mac 4 is a far more mature product. The speech recognition is excellent and the addition of the transcription feature could prove invaluable to students and those who need to write up speeches or presentations.

Pros: Excellent speech recognition; new multiple-profile transcription mode and Gmail integration

Cons: Browser control a little lacking; no punctuation in transcription mode



## Draft

Full review: [tinyurl.com/k5cvwua](http://tinyurl.com/k5cvwua)

★★★★★



[draftin.com](http://draftin.com); Free, \$3.99 (£2.40) per month, \$39.99 (£24.40) per year

Drafts is currently free to use as the developer, Nathan Knotny, improves and adds features. Note that it's all the work of just one guy. You're encouraged to subscribe to keep the project going – and we think it's worth it.

Pros: Collaborative document editing; strong version control

Cons: A little slow when switching between views or importing



## SimpleTax

Full review: [tinyurl.com/n6pudsf](http://tinyurl.com/n6pudsf)

★★★★★

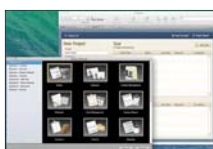


[gosimpletax.com](http://gosimpletax.com), Free

SimpleTax is a great service for those with straightforward tax affairs but who lack the confidence to do their own calculations. Accountancy fees can be an unwelcome expense, but this does a similar job – and for free. Best of all, it demystifies the whole process, showing in simple terms what you can and can't claim for.

Pros: Free; import data from your own sources; calculations performed for you

Cons: You'll need to have all your tax details to hand before you start



## FileMaker Pro 13

Full review: [tinyurl.com/nwsp3hc](http://tinyurl.com/nwsp3hc)

★★★★★

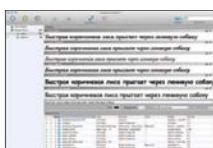


[filemaker.co.uk](http://filemaker.co.uk), £286

If you're already a FileMaker user, the upgrade shouldn't take much thinking about. This version builds significantly on the offering you already have – especially if you need to deploy to mobile devices. And if you're looking for a database-building tool for the first time, FileMaker Pro 13 has many attractions.

Pros: Fast database design with Starter Solutions; styles and templates; deployment to web and mobile devices

Cons: Additional costs build up for web deployment



## Extensis Suitcase Fusion 5

Full review: [tinyurl.com/Lpwyxgp](http://tinyurl.com/Lpwyxgp)

★★★★★

[extensis.com](http://extensis.com); £84, upgrade £42

The latest upgrade to Extensis' font-management system doesn't give you as many new features as did v.4 but, as designers adopt Creative Cloud, Suitcase Fusion users will inevitably need the new plug-ins. The QuickComp feature is attractive and works well if you're doing initial concept work.

Pros: Adobe CC in-app support, QuickComp template previewing, tweaked user interface

Cons: No support for Adobe Typekit



## NoteSuite 1.0

Full review: [tinyurl.com/px4wrd3](http://tinyurl.com/px4wrd3)

★★★★★

[notesuite.io](http://notesuite.io), £2.99

NoteSuite is a good note-taking app, even if it can't outgun rivals such as Evernote. However, its outstanding feature is the smooth iCloud syncing, which will definitely appeal to anyone that uses an iPad or multiple Macs.

Pros: Affordable, versatile tools for organising notes and to-do lists; automatic iCloud syncing; works on Mac and iPad

Cons: No iPhone version; fewer features than the iPad version



## TopXNotes

Full review: [tinyurl.com/q9kh4xk](http://tinyurl.com/q9kh4xk)

★★★★★

[tropic4.com](http://tropic4.com), £27

TopXNotes's price is pretty steep, but it's clear its features were designed for those who take seriously the task of keeping notes. If you fall within this audience, the app does its job capably and efficiently, with an impressive array of features and a user interface that's well thought out and provides an excellent user experience.

Pros: Plenty of functionality at your fingertips; effortless search features; helpful MultiView for perusing multiple documents

Cons: MultiView windows don't resize properly



## Scapple for OS X

Full review: [tinyurl.com/oo6w93](http://tinyurl.com/oo6w93)

★★★★★

[literatureandlatte.com](http://literatureandlatte.com), £10

If you are prepared to embrace thinking visually, Scapple is a useful tool that could turn small ideas into big ones without too many headaches. Equally, it's a handy way of collecting scraps of ideas that may not come to anything, but make more sense when seen together.

Pros: Drag-and-drop simplicity; freeform note making; Scrivener integration; ability to easily export notes for sharing and printing; iCloud support; MathType support; inexpensive

Cons: Users need to start mapping ideas visually and regularly; some features including iCloud support dependent on OS X



## SiteMaker Moonfruit Standard

Full review: [tinyurl.com/ndfemre](http://tinyurl.com/ndfemre)

★★★★★



[moonfruit.com](http://moonfruit.com), £7.20 per month

Moonfruit is a polished, slick, web-design application, with nearly all the features you could need. It's well-designed and makes it easy to customise a template. All the key features are in place to create a modern-looking, full-featured site that's easy to edit.

Pros: Very well-designed; easy to select and customise a template; key features in place

Cons: Low storage allowance



## 1&1 MyWebsite Personal

Full review: [tinyurl.com/ojxq2oy](http://tinyurl.com/ojxq2oy)

★★★★★

[1and1.co.uk](http://1and1.co.uk), £6 per month, £72 per year

1&1 MyWebsite Personal is a decent tool for putting together a standard website. There are a lot of predefined templates (300 to be precise), so finding something from which you can work is easy.

Pros: 300 templates; straightforward; automatic picture-size optimisation

Cons: Template categories are less than helpful



### Intego Mac Internet Security X8

Full review: [tinyurl.com/lyfznc0](http://tinyurl.com/lyfznc0)



intego.com; £40 per year

If you want software that consistently scores highly for spotting malware, Intego is for you. It's simple to install and set up, scored highly in our lab tests and has a minimal effect on Mac resources in normal use.

Pros: One of the most effective malware solutions for OS X; little resource hogging; easy to set up and use

Cons: Not as configurable as some



### Eset Cyber Security

Full review: [tinyurl.com/nsu3zqz](http://tinyurl.com/nsu3zqz)



eset.co.uk; £30 per year

Eset Cyber Security for Mac is a sophisticated security application with good malware detection. It's suited to anyone who likes to tweak and optimise, but is still simple enough to install and start comprehensive protection for any user.

Pros: Decent malware protection; sophisticated options available; fast on-demand scans

Cons: Can be complex to configure



### Avira

Full review: [tinyurl.com/mnp00ry](http://tinyurl.com/mnp00ry)



avira.com; Free

Avira's free offering for Mac users has good malware-spotting skills and a tidy user interface that doesn't detract from its duties. With a low impact on system performance, Avira shouldn't make its presence known when working behind the scenes.

Pros: Free; good malware detection; little system slowdown; better privacy policy

Cons: Heuristic scanning sometimes produces false positives



### Parallels Desktop 9

Full review: [tinyurl.com/qjeps4](http://tinyurl.com/qjeps4)



parallels.com/uk; £64

Parallels has added some useful new features to its Desktop 9 application, keeping it the highest-performance virtualisation package for OS X. It's support for OS X guests is embarrassingly poor, but Windows and Linux both work very well, and with terrific graphics that make these VMs feel like native installs in full-screen mode.

Pros: Fast and fluid for Windows and Linux VM guests; good integration for Windows 8 and 8.1; easier installation from disk images; better battery economy

Cons: Mac OS X as guest machine almost unusable



### Cocktail 6.7

Full review: [tinyurl.com/noq5co6](http://tinyurl.com/noq5co6)

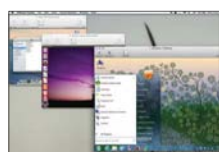


maintain.se; £10

While most of Cocktail's features already exist on the Mac, being able to access them without using a number of system tools and Terminal make Cocktail a highly useful utility. The unregistered version of Cocktail allows for 10 launches before timing out – that should be sufficient for you to decide whether it is right for you.

Pros: Comprehensive set of repair and maintenance tools; additional Automator actions; automatic Pilot mode; software frequently updated

Cons: Some tools are complex to use



### Freeway Pro 6

Full review: [tinyurl.com/kx9toz4](http://tinyurl.com/kx9toz4)



softpress.com; £104

This design-led tool will let you publish content-rich websites in modern browsers, simply and at a very fair and reasonable price. It's not perfect: laying out elements could do with some automation, for example, and Freeway Pro apparently has only one level of undo.

Pros: Publish content-rich sites; fair price; HTML 5 support; 20 percent discount to education, charities and the elderly

Cons: Could do with more automation; one level of undo



### Samepage.io

Full review: [tinyurl.com/Lxgbhjc](http://tinyurl.com/Lxgbhjc)

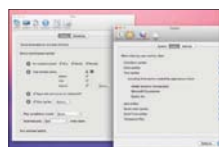


kerio.co.uk; free

Kerio Samepage.io will appeal to small businesses and individuals who have used Workspace before, but it's far more accessible to newcomers, with its much reduced learning curve. It's free to try, too, so if you're managing team projects, take a look.

Pros: Cloud based; remotely hosted; build your own team collaboration or project space; 10GB storage in free version

Cons: Workspace users may be disappointed the software has been replaced by Samepage



### CleanMyMac 2

Full review: [tinyurl.com/qftxvdx](http://tinyurl.com/qftxvdx)

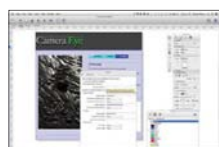


macpaw.com; £34

This seasoned utility can deal with almost every aspect of data cleaning. It's expensive when compared with single-function open-source apps, but its integrated approach is well worth the money. There's a good reason why CleanMyMac has built up an enviable reputation, and this version will only further enhance that.

Pros: Excellent user interface; comprehensive set of tools; clear explanations of scan results; highly configurable

Cons: A little expensive



### PrivacyScan 1.2

Full review: [tinyurl.com/qygtfer](http://tinyurl.com/qygtfer)



macscan.securemac.com; \$14 (£9.70)

PrivacyScan is a worthwhile addition to your set of security tools. It's easy to use, handles most modern web browsers and also supports common Mac apps.

As long as you remember to run it, you can rest assured that your privacy will remain protected.

Pros: Easy to use; can remove an array of privacy threats; supports most modern browsers and essential Mac apps; includes secure shredding as well as standard delete

Cons: No scheduling or automation features; no ability to preserve some data



### Extensis Portfolio Server 11.0.1

Full review: [tinyurl.com/o73r6tx](http://tinyurl.com/o73r6tx)



extensis.com; Studio £1,798, POA for Professional and Enterprise editions

Portfolio Server effortlessly handles media management, and support for more file types and client customisation is welcome. Flash is required for all Client and Server web browsers, so may restrict your Client base. The Studio version has a one catalogue/three-user restriction.

Pros: Rapid and effective cataloguing of growing range of assets; more user customisation; AutoSync folders; enhanced keywording and metadata features

Cons: Flash-based web clients restricts some use; Studio version is limited to one catalogue and three users

# After five years, I've fallen out of love

The iPad is a lovely thing, but now hardly loved

**T**here's no doubt that in its five years of existence Apple's iPad has revolutionised personal computing. It just hasn't revolutionised mine. I really did think it would, but it hasn't. In fact, I hardly ever use it any more.

Everyone wanted one. But how many people still actually use it that much? I was an early iPad adopter, and even upgraded to version 3 (can't remember why, though). But my iPad lies mostly unused in the tech drawer at home – with the wired headphones, Apple TV and viper's nest of USB cables and adaptors.

When the iPad was born my daughter was approaching three, and ripe for the many apps that soon begged to be downloaded. She was an eager user, and I followed suit, downloading apps and playing games with her. But over time she asked for the iPad less and less, preferring, as I do, the convenience of the iPhone, which is more likely to be around or indeed charged.

I never really got into reading newspapers and magazines on the tablet. The few situations I have for reading periodicals fall out of the iPad's reach.

The apps that once bonded my daughter and me to the iPad are pretty much all available on the iPhone. There are exceptions where the iPad's larger screen does justice to the apps: Let's Create Pottery and Spy Mouse, for example. Even the expansive world of Minecraft works fine on an iPhone 6.

Of course, most games and photos look better on the larger screen. But how often do you put your phone aside to get out the iPad to take advantage of that 9.7in screen. And shoot me if you ever see me outside taking a photo with one.

One game that demands the iPad is the wonderful Osmo, which actually moved the tablet on to another level of



**Apart from speed – and improved free versions of iOS – the iPad hasn't really changed at all in the past five years**

gameplay. If there were more apps like Osmo and my iPad would leave the cupboard more often.

But for everyday personal computing, the phone and a laptop will do just fine: email, web browsing, Facebook, sports results, news sites, Google, Wikipedia, Excel, Word, Calendar, iTunes, and so on all aren't made greater on an iPad. Often they're better on a smaller screen.

That big slab in between doesn't get a look in much any more – unless you don't have a smartphone or laptop, and who doesn't these days?

Sure, the iPad works for some things: commuters watching movies and TV shows. FaceTime maybe, but that's more convenient on an iPhone, I'd argue. Bigger screen = better, unless you have to hold it too long and wear out your arms.

The fact remains that in my house the iPad is rarely seen. My daughter, now

eight, is no screenaphobe. She'll happily sit in front of our iMac or MacBook Air coding all day (tablets are better at consumption than creation) or watching clips of *Horrible Histories*. But only when she tires of such things might she enquire about the whereabouts of the iPad.

If he was still with us, I wonder if Steve Jobs would agree with himself (which he mostly did) when a few years before he revealed the iPad, he said that a tablet can't do much more than an iPhone can.

Apple sold 300,000 iPads on its day of release, and a staggering 18 million in its first year. Total worldwide sales of the iPad are now in the region of 256 million.

But, while still buoyant, iPad sales have declined over 20 percent since this time last year. Last October they dropped 13 percent. The quarter before they'd fallen 16 percent. Indeed, sales of all tablets (iPads and Android) fell nearly 10 percent in the final quarter of 2014.

Apart from speed – and much improved free versions of iOS – the iPad hasn't really changed at all in five years. I haven't been tempted by a Retina display iPad. It's just a nicer screen. If my current iPad's display was rubbish I might have been tempted to upgrade, but it's just fine for me.

There are no other new features in the hardware. You can't say the same about the latest iPhones, with their larger screens that have proved wildly popular.

Another reason that iPhones are upgraded more often than iPads is the way that we basically rent them through carrier Pay Monthly deals. These mostly run out every two years, just in time for a 'cheap' upgrade to the latest model.

The iPad is a beautiful but largely pointless thing. Happy Birthday to you! As a treat, I'll get you out of the drawer tonight and see if you have enough charge for a play.





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